AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Published by Howes Publishing Company, 90 William Street, New York.

Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

VOLUME XVI NEW YORK, APRIL 18, 1927 No. 6

Removing Stains from Cellulose Acetate Rayons*

Differences in Rayons Has Made New Processes Necessary—Cellulose Acetate Process—Method of Identification—Reaction to Common Reagents—Need for Spotting Agents—Procedure

By M. H. GOLDMAN and C. C. HUBBARD

National Association of Dyers and Cleaners

RAYON has become an important fiber not only to the textile industry but to the large consuming public which the dry-cleaner and dyer serves.

The large production and use of rayon in all types of clothing materials have to some extent added to the difficulties of the maintenance group (laundrymen and dry-cleaners). It has been necessary to develop careful methods of washing and dry-cleaning. The similarity in appearance of some of the rayons to silk yet the markedly different reactions to dyeing reagents have made necessary several new processes in the redyeing of these products.

The dyer and cleaner soon finds that, although many of these materials are classed under the general term "rayon," there are really two distinct groups—the regenerated celluloses, including the viscose, cuprammonium and nitrocellulose rayons, and the unregenerated cellulose, or cellulose acetate, type.

All the rayons may start from a common base; the difference lies in the method of production. In general, the difference between the final products is that the regenerated celluloses are similar to cotton in their reaction to reagents, and the unregenerated celluloses, which are really compounds of cellulose, have some characteristics entirely different from those of any other textile fiber now in use.

The Cellulose Acetate Process†

When cellulose is heated under pressure with acetic anhydride, acetates of cellulose are formed by interaction with the hydroxyl groups. The composition of the acetate depends upon the proportion of acetic anhydride used, the temperature of the reaction and the presence or absence of a hydrolyzing agent, such as zinc chloride.‡

By varying the temperature and the proportions of acetic anhydride, mixtures of the acetates are obtained. The final product is made from a viscous solution of a mixture of acetates in a suitable organic solvent by evaporating the solvent or coagulating the acetate.

Method of Distinguishing Cellulose Acetate Rayon

The dry-cleaning establishment uses rapid qualitative methods for distinguishing rayons and silks. It is well to point out that a test for cellulose acetate will require only a few moments and may save the cost of the garment. This test may be made as follows: Take a thread or two from some unexposed portion of the garment and place it in glacial acetic acid or in acetone. If it is cellulose acetate it will dissolve almost instantly.

Reaction of Cellulose Acetate Rayon to Common Reagents

The reaction of the cellulose acetate rayon to some of the most common reagents used in the dry-cleaning plant is summarized as follows:

Soluble in—

Acetic ether (ethyl acetate)
Acetone
Alcohol + benzol
Alcohol + ether
Amyl acetate (banana oil)
Aniline

*Published by permission of the Director of the National Bureau of Standards of the U. S. Department of Commerce.

†These products are now being sold on the market as "Celanese," manufactured by the American Cellulose & Chemical Manufacturing Company, Ltd., 15 East Twenty-sixth Street, New York City, and "Lustron," manufactured by the Amoskeag Manufacturing Company, Manchester, N. H.

‡Trotman, S. R., Bleaching, Dyeing and Chemical Technology of Textile Fibers, p. 146; 1925.

Chloroform
Cresol
Ethylene dichloride
Formic acid
Glacial acetic acid
Nitrobenzene (oil of mirbane)
Orthotoluidine
Phenol
Pyridine
Tetrachlor-ethane (acetylene tetrachloride)
Triethyl phosphate

Less soluble in—

Carbon tetrachloride
Fusel oil (amyl alcohol)
Grain alcohol (ethyl alcohol)
Trichlorethylene
Wood alcohol (methyl alcohol)

Not soluble in—

Alkalies (dilute)
Benzol
Carbon disulphide
Chlorhydrin
Gasoline
Glycerine
Hydrosulphite solution
Naphtha
Turpentine

It must also be observed that although when used alone benzol does not attack and alcohol only slightly attacks cellulose acetate, yet benzol containing a small percentage of alcohol at 50 deg. Cent. (122 deg. Fahr.) quickly dissolves the fiber.

Need for Spotting Agents

It is readily observed that this material is soluble in a large number of reagents which, experience has shown, are almost a necessity in removing certain types of stains. The development of some means of spotting which would overcome this difficulty was urgently needed, since, as stated, more and more garments wholly or partly made of cellulose acetate rayon are reaching the cleaning plant.

The research associateship of the National Association of Dyers and Cleaners at the Bureau of Standards accordingly undertook this problem in connection with its studies of many cleaning projects.

Procedure

Some attention was given to the idea that a method of finishing might be evolved and submitted to the manufacturer of the fiber which would permit the use of various organic solvents. A preliminary survey showed the futility of such a scheme, since it involved making practically a new material, for the appearance (and other properties) of the original might be greatly altered. A method for local spotting seemed to be the only solution.

The silk-dyeing industry has found that silk for resist dyeing can be dyed with sulphur colors, using a strongly alkaline bath, provided glue or glucose is added. Ordinarily, of course, the alkalinity of such a dye bath would seriously injure the silk.

Working along analogous lines, some tests were made using mucilage and dextrose mixed with spotting agents. Mucilages are solutions of dextrines, gums or modified starches, alone or as mixtures. They may or may not be reinforced with liquid fish glue or animal glue.

Mucilage, it was found, when added to the spotting agents protected the rayon. But only small amounts of the spotting agents could be added, because of precipitation of some of the ingredients in the mucilage. This added to the difficulties of the spotting, for, on account of the small amount of reagent used, a longer period of spotting was required, with consequent possibilities of losing the protective action of the mucilage and injury to the fabric by excessive abrasive action at the spot.

Glucose did not protect the fabric.

It was found that organic compounds containing chlorine when used with the mucilage facilitated the removal of the stain by permitting a greater percentage of the spotting agents to be added. Compounds such as benzoyl chloride, carbon tetrachloride, chloroform and monochlorhydrin were found to be effective, as they kept the ingredients of the mucilage in solution much better.

Mono-chlorhydrin mixed with mucilage was found to be the most effective of the above chlorine compounds. It was further found that chlorhydrin acted as a protective agent itself, for when tried without the addition of mucilage, with a number of spotting agents that by themselves would dissolve the cellulose acetate rayons, it proved very successful. It was noted that even when it was applied by itself directly to the stain, and then followed with the spotting agents, there were no ill effects. Besides its high viscosity, chlorhydrin is very desirable on account of its solubility in water, alcohol, ether, etc. However, chlorhydrin is not readily available in a dry-cleaning plant, so some experiments were made with glycerine, which is only slightly different from it in properties. Very favorable results were obtained.

Most of the common spotting agents were tried, using half glycerine and half reagent. For instance, a sample of cellulose acetate was stained with dark brown linseed-oil paint. A spotting solution was prepared with equal parts of glycerine and glacial acetic acid. The fabric was unharmed and the stain was removed. A solution was also tried using three parts glycerine, two parts glacial acetic acid and one part acetone, with similar results. (Either glacial acetic acid or acetone will almost instantly dissolve cellulose acetate rayon when used alone.) As a final test, a sample of cellulose acetate rayon was submerged in the latter spotting solution for over an hour and no evident damage occurred. Of course, in all cases the spotting solution must be rinsed thoroughly from the fabric. This can usually be accomplished by sponging with water.

Strength tests were made on a sample of cellulose ace-

tate material after various treatments. It was found (1) that the treatment with glycerine alone did not decrease the strength, (2) that the treatment with the mixture of glycerine and spotting agents decreased the strength in the same degree as water, and (3) that after the mixture was removed the original strength was regained. No color discharge was evident, and "rings" did not occur when the same care as is usual in spotting was observed.

SUMMARY

Cellulose acetate rayon, an unregenerated cellulose, when stained presents unusual difficulties to the cleaner, because many of the common spotting agents will injure or dissolve the fiber.

The following procedure is recommended:

1. Test the material to determine whether it is a cellulose acetate type by applying acetone or glacial acetic acid to some unexposed portion of the garment. If it dissolves almost instantly it is cellulose acetate rayon.
2. Select the spotting reagent or reagents necessary to remove the stain, and mix a solution of one part of the reagent or reagents and one part glycerine.
3. Spot the stain in the usual manner.
4. Rinse or sponge with water until all the spotting agent is removed.

"Colloid Dynamics" in the Textile Industry

Practical Applications of Colloidal Dynamics—Theory of Dyeing

By CHAS. E. MULLIN, M.Sc., F.A.I.C.
Consulting Chemist, Camden, N. J.

DURING the week of January 10 to 14, 1927, Dr. Victor Coffman, of the research laboratory of Armour & Co., Chicago, Ill., gave a series of five lectures upon "Colloid Dynamics" which were of extreme interest to all textile as well as other chemists. Unfortunately, very few textile chemists were in attendance.

The subject "Colloid Dynamics" has a rather fearsome sound to many industrial chemists, most of whom have forgotten considerable of the highly involved mathematics of physics and physical chemistry, but the subject is most certainly of great interest to textile chemists, more of whom should have been in attendance at the above lectures. The subjects of the five lectures were as follows:

1. The meaning of the word "colloid." The ideal colloid and the factors which govern its physical changes.

   The pressure of colloids; the surface pressure of adsorbed substances; the "osmotic" pressure (pressure of swelling) of gells.

   The volume of colloids; the thickness of the surface region.

   The "temperature" of colloids; the change in surface tension with pH. The electrochemical potential and the H-ion concentration.
2. Spontaneous dispersion: The transformation of chemical into surface energy.

   Emulsions and the factors that influence them.

   Electrical dispersion: The transformation of electrical into surface energy.

   The two types of electrical potentials at phase boundaries and their relation to surface phenomena.
3. Surface solutions and thin films. The gas laws in surface solutions and colloids. The Gibbs and other adsorption formulas as special cases of a simple general relation. The velocity of adsorption.
4. Physiological applications:

   Muscular action and its dependence upon "surface" forces. The muscle as a colloid engine working at constant heat temperature.

   Nerve conduction: The propagation of disturbance in colloid media.
5. The new colloid concepts and classical thermodynamics.

PRACTICAL APPLICATION OF COLLOIDAL DYNAMICS

Almost every problem before the textile chemist of to-day, from the colloidal structure of the fiber itself to its final scouring and finishing, involves colloidal dynamics to some extent.* Frequently it is one of the most important factors involved, such as in the preparation of emulsion, etc. All textile fibers, both natural and artificial, are in the colloidal condition and, with the exception of acetate silk, form gels in aqueous solutions. Therefore it is only natural that this phase of science should play an important part in the textile industry.

Soap under the conditions desirable for cleansing forms

*Materials in the colloidal state are commonly but incorrectly spoken of as "colloids." The colloidal is a state, and not a distinct variety, of matter. Practically all colloids, under suitable conditions, may be crystalloids, while the reverse is equally true. There probably are no true "colloids," as formerly supposed.

a colloidal solution in water, and all detergent problems involve colloid dynamics, in that they involve both surface films and emulsification of the "dirt" in the aqueous cleansing liquid. The starches, gums, gelatin and glue, oils, soaps, clays, etc., used in sizing, as well as in some finishing operations, are in the colloidal state, and the preparation and correct use of sizing and finishing materials and mixtures involves a complete knowledge of colloid dynamics. Furthermore, most dyestuffs are more or less in colloidal solution in the dye bath, depending upon the exact conditions involved.

The surface tension of solutions, which, according to our present knowledge, appears to be the principal factor in the "wetting-out value" of aqueous solutions, is usually closely related to the film of colloids on the surface or interface of the aqueous phase. This surface tension, and probably the state of the "colloids," appears to be closely related to the hydrogen-ion concentration of the solution, as well as the temperature, so that, according to the foremost theory of detergent action, a complete knowledge of colloid dynamics is essential, or at least desirable.

In the Theory of Dyeing

While the colloidal theory of dyeing is probably not quite as widely accepted by the dyers of to-day as it once was, undoubtedly the behavior of matter in the colloidal state, and particularly colloidal solutions and surface adsorption, are important details in connection with all dyeing problems.

The above are only a few of the many, and in fact almost universal, applications of colloid dynamics in the textile industry. They merely point out a few of the applications in the textile and related industries of the "textbook theories" of our colleges and universities. It will repay the industrial chemist to keep fully posted on the theories advanced in connection with colloid dynamics, as well as most of the other branches of science which are not quite as popular as they deserve; for example, pH work and the theories involved.

It may be of interest to those who did not attend the lectures to know that Dr. Coffman covered the subject in an extremely interesting manner, and presented many new views and ideas in a readily assimilable form, reducing to a minimum the references to highly involved mathematics and the intricate physical formulas usually associated with this subject.

Pennsylvania State College and the members of the faculty who arranged this highly successful program are to be congratulated. Every courtesy and consideration was shown to all visitors, and Dr. Coffman was available during the day for consultation and discussion upon subjects of interest. State College plans a number of equally interesting programs for industrial chemists in the near future, and it is hoped that the textile industry will be more largely represented at these future gatherings.

INSTITUTE OF CHEMISTRY PLANNED BY AMERICAN CHEMICAL SOCIETY

Formation of the Institute of Chemistry of the American Chemical Society, which, beginning this year, will bring together every summer, at a center of technical education, chemists from the nation's laboratories of industry and education, is announced following action by the society's executive committee.

The Chemical Foundation, Inc., and the Pennsylvania State College have agreed to furnish the funds to put the plan in operation for the first session, to be held during July, 1927, at Pennsylvania State College, according to an announcement made by President George D. Rosengarten.

Northwestern University has requested the privilege of being the second university to co-operate with the society, and the session of 1928 is to be held at Evanston. Places for the third and subsequent sessions remain to be chosen.

"The purpose of the Institute of Chemistry," said Dr. Rosengarten, "is to offer a series of lectures and demonstrations whereby those in attendance may be brought quickly up to date in fields both within and outside their own specialty, and to afford facilities for teachers to acquire the latest information in chemical science as well as to benefit from the contacts with the industrial and consulting professional chemists.

"The professional chemist sometimes becomes discouraged with his inability to keep abreast of the progress of chemistry in all its ramifications. He is required in many instances to specialize to a high degree, yet he maintains his interest in the subject as a whole. He intends to read widely enough to possess current information, but cannot always find time to carry through his plan.

"For such a man a series of morning lectures designed with his needs in mind and delivered by specialists will lay before him in ample detail the present status of the science, sweep away the cobwebs and greatly increase his familiarity with chemistry as it is to-day.

"Many of the younger men in industry can profit by such lectures, as well as by an intensive course of study in special subjects which they find desirable in their work.

"Such a series of lectures is equally important to the teacher, whether his or her activities lie in the high school, the preparatory school, the college or the university. In addition, an inspiration is sure to be found in the opportunity to discuss all sorts of topics with those whose names have become familiar through their actual achievements in chemical science, both pure and applied.

"A third group to profit from the activities of the Institute will be the general student, the specialist in allied fields, and the public, all of whom will find in courses of evening lectures presented in a somewhat

more popular style much that will interest and instruct them.

"It is planned that teachers and others desiring to do so can take the stated courses in chemistry throughout the summer school and receive credit therefor, so that in a combination of the Institute of Chemistry of the American Chemical Society and the regular summer school courses of Pennsylvania State College the requirements will be met.

"The contacts between groups of individuals we consider an important factor in the attractiveness of the plan. There are very few chemists, whether they be in industry or academic life, who have not longed for such an opportunity to meet the leaders of their profession. The most profitable contacts are those formed during periods of leisure and relaxation provided by the Institute plan.

"Arrangements have been made to house the members of the Institute in convenient groups, and all will come together at meal time. In a new fraternity section, twelve modern houses—none more than three years old and all attractively furnished—will be reserved for Institute members. Experience has shown that these details, as developed by the Institute of Politics at Williamstown, are highly beneficial."

The affairs of the Institute, according to the announcement, will be directed by a committee upon which academic and industrial men will have full representation.

A Sulphur Black from Dinitro-Phenylazo-Diphenylamine

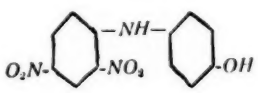
By A. BERETTA

(*Giornale di Chimica Industriale, No.* 3, 1926)

Translated by Dr. Paul Bartholow

BY fusion of various products with sulphur or alkaline sulphides, it is possible to prepare on an industrial scale a numerous series of sulphur dyes, from which nearly all shades may be obtained except red. Especially important as intermediate products for the preparation of these coloring matters are the derivatives of diphenylamine.

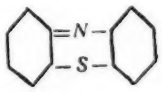
It is well known that from the time L. Cassella & Co. introduced into commerce their immedial black, "Immedialschwarz," [1] the first sulphur black of great value, obtained by fusing 2-4-dinitro-4-oxydiphenylamine with sulphur and alkaline sulphides,



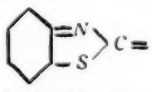
a new era opened, remarkable for the manufacture of sulphur dyes, in consequence principally of the fact that we can prepare by simple fushion with sulphur and alkaline sulphide the greatest variety of dyes from this base. In this way we obtain numerous coloring matters, black and blue, of great interest in the industrial field on account of their valuable dyeing qualities, in which field the most important representatives are the different immedial indoins, *pure azure immediates*, etc., and to a lesser degree the katigenes and pyrogenes.

Although the material experimented with, which is almost exclusively found in the patent literature, has been considerably augmented of late years, and though much may have been gained regarding the reactions which occur in the formation of these dyes, nevertheless the subject always bristles with difficulties; and, as an actual fact, notwithstanding the great contributions made by chemists like Vidal, Friedlander, Wahl, Nietzki, Lange,[2] Sandmeyer, etc., we are not yet in a position to determine with precision the true structure of these bodies.

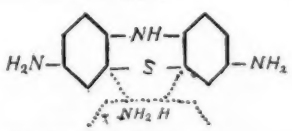
Fusion of derivatives of diphenylamine with sulphur and sodium sulphide preferably results in the formation of black dyes; with derivatives of amino-oxy-diphenylamine and its corresponding N-alkyls and N-aryls we obtain blue coloring matters, while in the presence of the meta-substitutes of stable nature we obtain brown and yellow dyes. It is generally admitted that during the reactions the formation of mercaptans and polymercaptans occurs (in the ortho position with respect to N and O) which give ulterior products of condensation; for example, black dyes and blues of thiodiphenylamine (thiazine),



and yellow and brown dyes from thiazole;



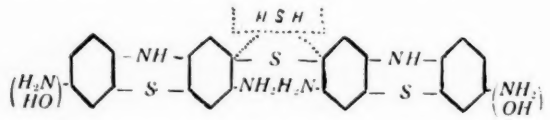
According to Vidal, the blacks and blues result from derivatives of diphenylamine, with the formation first of thiodispenylamine of the type,



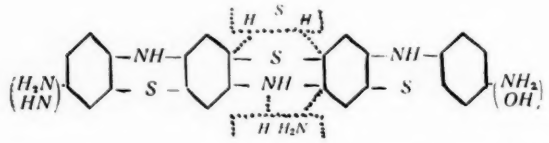
[1] D. R. P. 103,861.

[2] Otto Lange, Die Schwefelfarbstoffe.

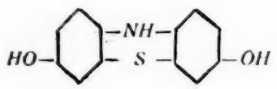
which by condensation with equal or similar molecules, without the evolution of NH_3, give blue dyes,



while by condensation with equal or similar molecules, with the evolution of NH_3, give black dyes,

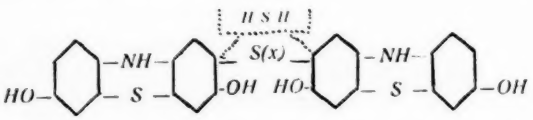


These formulas of Vidal are the general expressions for the formation of the nucleus or basis of sulphur blacks and blues; they do not, however, express the chinoidal chains (legame chinoidi), nor do they explain very well the easy solubility of the black dyes in alkalies nor their insolubility in acids. Nevertheless, with these formulas we can explain very clearly how we obtain hydrogen sulphide by means of the blue dyes, while the evolution of ammonia during fusion favors the formation of the black dyes,



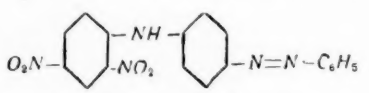
From dioxy-thiodiphenylamine =

through the absence of the NH_2 group it is never possible to eliminate ammonia; the condensation therefore of a number of these molecules can only occur in this way:



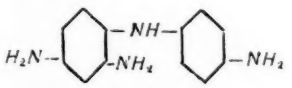
This may be regarded as a probable formula for blue dyes.

Having had occasion to occupy myself with other angles of 2-4-dinitro-4-phenylazodiphenylamine,

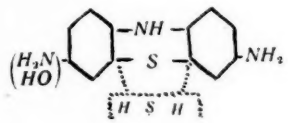


I thought of submitting this derivative to the action of the alkaline polysulphides, with a view to obtaining from it a sulphur dye. The dye which results from this, given the nature and the position occupied by the substitute groups in the molecule of dinitro-phenylazo-diphenylamine, bears a close relation to that which obtains by the action of sulphur and sodium sulphide on 2-4-dinitro-4-amino-diphenylamine.[3] Fusion, carried out at a temperature of 140 deg., results in the elimination of NH_3, and the course of the reaction may be interpreted by considering the following stages in the formation of the nucleus base:

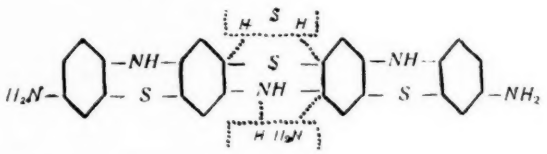
1. Reduction of the dinitrophenylazo derivative and triaminodiphenylamine,



2. Formation of the nucleus thio-diphenylamine with the elimination of NH_3,



3. Condensation of the thio-diphenylamine groups with the ultimate liberation of NH_3,



resulting in a black dye.

The dyestuff which thus occurs appears in the form of a black amorphous powder which dyes cotton a grayish green to black. Solutions of the dyestuff in sodium sulphide are of a greenish brown; in concentrated sulphuric acid it dissolves with a dark green color. In preparing 2-4-dinitro-4'-phenylazo-diphenylamine, instead of following the original method,[4] it is possible to work in the following manner:

In a flask provided with an ascending refrigerating coil, 23.3 grams of p-aminoazo-benzol hydrochloride are placed with 20 grams of 2-4-dinitrochlor-benzol, 25 grams of anhydrous sodium carbonate and 300 c.c of water. They are then heated together over a naked flame for twenty-four hours with occasional agitation to insure regular ebullition, the mass being filtered by suction while still hot. From the filtrate by refrigeration we recovered a portion consisting of dinitrophenate of sodium arising from dinitrochlor-benzol which did not enter into the reaction, while the solid mass remaining on the filter was extracted repeatedly with boiling water to liberate it from the dinitrophenate and from the aminoazobenzol still present and capable of quantitative recovery by fractional crystallization.

The reddish-brown product which remains after this treatment is composed of 2-4-dinitro-4'-phenylazodiphenylamine almost pure, and as such ready for the preparation of dyes.

For this purpose 44 grams of crystalline sodium sul-

[3] D. R. P. 114.119.

[4] Charrier and Beretta, Gazz. Chim. Ital., 5e, 729, 1923. Bizioli. Operazioni fondamentali della chimica dei coloranti, 172, 1923.

phide are placed in a flask provided with an ascending refrigerating coil and 20 c.c. of water added, which are heated to 100 deg. over an oil bath, with the gradual addition of 16 grams of flowers of sulphur until complete solution has taken place. The temperature is raised to 130 deg. and 25 grams of 2-4-dinitro-4-phenylazodiphenylamine, finely powdered, are added, little at a time, and then boiled for six hours at 140 deg. The product of the reaction is treated with boiling water and the dyestuff precipitated by means of a current of air. Desiccated in the oven at 60 deg., it appears in the form of a black powder soluble in sodium sulphide with a greenish-brown coloration. In concentrated sulphuric acid it dissolves with a dark green coloration.

The author, in describing this new sulphur black obtained by fusing 2-4-dinitro-4'-phenylazodiphenylamine with alkaline polysulphides, and in order to make the process technically superior, has prepared this intermediate product by causing the dinitrochlor-benzol to react with p-aminoazobenzol in aqueous solution in the presence of sodium carbonate, instead of making use of the original method already expounded in a previous communication. This new method has the advantage of acting in an aqueous solution instead of in an alcoholic solution, and substitutes sodium carbonate for sodium acetate. The yield of the product of condensation, however, is inferior to that obtained by the first method. (Pavia, Institute of General Chemistry of the Royal University.)

[AUTHOR'S NOTE: The Kolaktiebolag, in Sweden, has patented a process of obtaining dyestuffs from methyl-isopropyl-phenanthrene,* which is found in the resin of redwood pine. According to the researches of E. Meyer, we can obtain a series of dyes, from yellow to brown or reddish brown, of the greatest value in dyeing cotton, linen and wool when sulphur and sulphur compounds are heated with methyl-isopropyl phenanthren and its derivatives (or with other aromatic substances, phenols, quinones, amino- or nitro-compounds) in various proportions and at different temperatures. Some of these substances serve directly as dyes; others should first undergo treatment with halogene or acids. It is worthy of note that under certain conditions methyl-isopropyl-phenanthren heated with sulphur alone gives yellow dyes which in an alkaline sulphur bath easily dye cotton without the use of mordants. If these dyes are oxidized with bichromate in a solution of acetic acid, we obtain, by precipitating with water, a substance which dyes cotton dark yellow.]

*Ind. Eng. Chem. News Ed., 20, Jan., 1926.

Reports of a proposed merger of the French chemical concerns, Kuhlmann, Gafsa, St. Gobain, Pechiney and Alsatian potash enterprises, are coupled here with a prediction that a Franco-German chemical pact may be in prospect, according to Trade Commissioner William T. Daugherty of Berlin.

PACIFIC MILLS BULLETIN TELLS OF RESEARCH

Exploration of new fields in textile chemistry is discussed in a recent number of "Pacific," the monthly bulletin that is issued by the Pacific Mills. This monthly bulletin presents its message in an interesting and attractive style. It carries to the buyer of textiles the story of what takes place in various mill operations, and should help to foster among its readers a broader understanding of the manufacturing end of the industry. The bulletin says:

"In few fields are the science and services of chemistry more useful to the world than in the textile industry. The chemistry department of a modern mill is almost as essential to the manufacturing as the machinery that produces the fabrics. It is constantly searching for improvements in processes, aiming at still higher quality of products and speedier and more economical operations.

"There are the fields of color, permanence of finish and new finishes for cottons, and shorter and less complex methods of bleaching open to the explorer. Pacific expeditions are adventuring into the unchartered regions of these and similar fields. Pioneering into the future not only offers new discoveries—it keeps an industry in the forefront of the present.

"The organization of the chemistry department is such that men who ordinarily in industry are tied to routine testing and administrative work have time to do the original thinking and give expression to the original ideas which all true students of science should have.

"Research work and experimentation are continually contributing to improved and more economical methods. For example, Pacific has developed a machine which combines several dyehouse operations, formerly requiring separate steps, into one straight-line process. This follow-through is both a time-saver and an economizer of physical effort, compared to the usual separate processing.

"Maintaining uniformity of color in the goods as each day's fresh start is made requires the exercise of great skill on the part of the textile chemist. One of the essentials is an unvarying temperature of the dye liquors. Pacific's chemical department has devised an automatic control.

"The chemist has a very practical place in the textile industry and a great many openings, when given the opportunity of exploring them, for constant improvement of manufacturing operations and in the character and quality of the goods."

J. B. Jones, who has for some time past been manager of the Chicago office of the Ciba Company, Inc., has resigned his position. His home address is 1347 Chase Street, Rogers Park, Chicago.

DR. AUGUST J. HUNZIKER

Members of the silk dyeing industry of Paterson, N. J., were deeply grieved to learn of the death of Dr. August J. Hunziker, who passed away on Monday, April 4, at his home in Arcola, Bergen County, after a heart attack.

Dr. Hunziker, one of the most prominent authorities on silk dyeing in this country, was vice-president and general manager of the Weidmann plant of the United Piece Dye Works. Known intimately in the trade, greatly respected for his unusual capacities as a craftsman, and well liked for his engaging personality, his loss is keenly felt throughout the silk dyeing industry.

At a special meeting of the Silk Dyers' Association, resolutions expressing the deep sorrow of the members over the sudden loss of one of is most valued members

were adopted. The dyers attended the funeral services in a body.

Dr. Hunziker, who was a member of the board of managers of the Silk Association of America for seventeen years, and long a member of the Silk Dyers' Association of America, serving as president of the latter during the past three years.

A committee of silk men representing the Silk Association of America, Inc., attended the funeral of Dr. Hunziker. The committee was composed of James A. Goldsmith, of Hess, Goldsmith & Co.; Robert J. F. Schwarzenbach, of Schwarzenbach, Huber & Co.; Charles E. Lotte, of the National Silk Dyeing Company; Carl Schoen, of Carl Schoen Silk Corporation, and E. C. Rossmassler, of Sauquoit Silk Manufacturing Company.

Dr. Hunizker is survived by his wife, who was Miss Alice Huguenin, of Zurich, and whom he married in 1900; two sons, who are studying in Switzerland, and a younger son and daughter, who are at home.

Born in Aarau, Switzerland, February 1, 1868, Dr. Hunziker received his early education there, later attending the Swiss Polytechnicum at Zurich, where he studied chemistry under three noted men: Professors Lunge, Hantsch and Treadwell.

Following his graduation in 1890, he went to the University of Geneva, where he studied two years under Professor Graebe and other eminent scientists and obtained his degree. During vacation periods at college he served his military period in the field artillery of the Swiss Army and became an officer.

Later he took a special course in dyeing and printing of textiles at Mulhausen, Alsace, where he worked in the laboratory of the Ecolo De Chemic. Through Prof. H. Noelting, of that school, he received a position with the Fabriques de Produits Chimiques de Tham de Mulhausen in the manufacture of dye preparations for the wool and cotton trade.

While there, he communicated with Jacob Weidmann, head of the Weidmann Silk Dyeing Company (now part of the United Piece Dye Works), Paterson's master of the dye art, who induced him to come to the United States, after he had worked for a time in the factory at Thalwill of his uncle, August Weidmann.

Dr. Hunziker's first duties at the Weidmann plant here were the manufacture of the black and red iron phosphate of soda, then tin crystals bichloride of tin, sumac and other preparations. President Wiedmann recognized Dr. Hunziker's ability, and placed him in charge of the laboratory of the plant, which was the leading silk dye concern of the country.

In 1900 Dr. Hunziker was made vice-president of the company, and when it was merged with the United Piece Dye Works he was elected a director and assistant treasurer of the latter.

His success at the Wiedmann plant, and his work for the Silk Association of America, and his work as officer and director of the Silk Dyers' Association of America won him wide recognition as one of the leading authorities in the silk dyeing industry of America. He was honored with a directorship in the Textile Alliance in representing the silk industry, and also membership in the American Chemical Society and the American Association of Textile Chemists and Colorists, and was for ten years one of the directors of the United States Testing Company. He was a member of the Paterson Chamber of Commerce and several other organizations of Paterson.

Hubert Watson, a student in the North Carolina State College Textile School from Worcester, Mass., made an interesting and instructive talk before the Textile Society on the manufacture of shuttles. Mr. Watson's father is the head of the J. H. Williams Company, makers of automatic and regular shuttles, reeds and iron and wood heddle frames. He has worked in the factory owned by this company and is well acquainted with the various operations used in the manufacture of shuttles. An especially prepared exhibit of the products of the various steps used in the manufacture of shuttles made the talk much more interesting.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

Vice-Presidents
E. H. KILLHEFFER—WALTER S. WILLIAMS

Secretary
WALTER E. HADLEY
5 Mountain Avenue, Maplewood, N. J.

Treasurer
WINTHROP C. DURFEE
516 Atlantic Avenue, Boston, Mass.

Councilors

RALPH F. CULVER — GEORGE A. MORAN
ARTHUR E. HIRST — HUGH CHRISTISON
WILLIAM R. MOORHOUSE — WALTER M. SCOTT

LOCAL SECTIONS AND THEIR OFFICERS

Northern New England Section—
Harold W. Leitch, Chairman, Franklin Mills, Franklin, N. H.
A. K. Johnson, Secretary, Lowell Textile School, Lowell, Mass.

Rhode Island Section—
John Hutton, Chairman, Glenlyon Print Works, Phillipsdale, R. I.
Albro N. Dana, Secretary, Franklin Process Co., Providence, R. I.

New York Section—
Herbert Grandage, Chairman, Clark Thread Co., Newark, N. J.
Daniel P. Knowland, Secretary, Geigy Co. 89 Barclay Street, New York City.

Philadelphia Section—
William Ralph MacIntyre, Chairman, Eddystone Print Works, Eddystone, Pa.
Percival Theel, Secretary, Philadelphia Textile School, Philadelphia, Pa.

Southern Section—
Leonard S. Little, Chairman, Pacific Mills, Lyman, S. C.
Dyer Moss, Secretary, Newport Chemical Works, Greenville, S. C

Lowell Textile Junior Section—
Samuel Meeker, Chairman; Bernhardt Glickman, Secretary.

MARCH MEETING OF THE NORTHERN NEW ENGLAND SECTION

The Northern New England Section held a very successful meeting on March 5, 1927, at the University Club, Boston, Mass., with about fifty members and guests in attendance.

Following the informal dinner Chairman Leitch called a brief business session, which was largely devoted to the announcement of the results of the recent ballot upon the question of the best nights for holding the meetings. A result, corrected for a few late returns, shows a three-to-one majority for Saturday when the meetings are to be held in Boston and a five-to-one majority for Saturday when the meetings are to be held outside of Boston. The tentative date for the next meeting was set for April 16, 1927.

Chairman Leitch then introduced the speakers of the evening: Walter F. Haskell, who presented the paper "Some Experiences with the Naphthol Colors, Especially Naphthol AS Red," and Walter C. Durfee, who gave an informal talk, with many timely demonstrations, on "Light and Color Vision and a Classification of Color Effects." It was very evident that both speakers had done much work in careful preparation of their respective papers, and the good reception which they received was well deserved.

The meeting adjourned to a social gathering at about 9.15 p. m. after a rising vote of thanks to the speakers for their kindness in presenting and discussing their papers.

A. K. JOHNSON, *Secretary.*

Some Experiences with the Naphthol Colors, Especially with Naphthol AS Red

By WALTER F. HASKELL
Dana Warp Mills

The modern dyer is frequently called upon to handle new colors and new methods with his existing equipment, and it is as an example of this problem that I offer this brief paper covering some of my experiences with Naphthol AS Red and a few other colors of this same nature. I am not attempting to describe the best method of dyeing this red on cotton warps.

Reds in the old days before 1914 were not very important in the business with which I am connected. We used to do some Primulines and, when better fastness to light was necessary, some Paranitraniline Red. This latter was rather a troublesome problem owing to our somewhat inadequate drying capacity and the lack of a suitable continuous machine. Careful planning was required to impregnate the warps with beta-naphthol, dry them and run them through the diazotized paranitraniline all in the same day. Naphthol AS when brought to our attention was of interest at once on account of the statement that it did not have to be dried before coupling, and also on account of the claims of superior fastness made for it. Before we could get any of this new color to try, the war came on and there were other things to think about.

First Trials

When imported colors became available after the Armistice, we obtained at the first opportunity some of the Naphthol AS and Fast Red G base. Our first trials were far from satisfactory, partly owing to the decomposition of the dye baths and partly to faulty equipment. It was evident that the directions given by the dyestuff manufacturers must be more carefully followed. One of their statements was that the yarn, after passing through the diazotized base, must be rinsed very soon. To bring this about at moderate expense we took two dyeing machines, one of which was exactly in front of the other—that is, both having the same longitudinal axis—and arranged a shaft with clutches so that both machines could be driven together at the same speed when desired or used separately as before.

These machines are rectangular wooden tanks equipped with guide rolls and with squeeze rolls at one end, such as are commonly used for chain warp dyeing. The tanks are about 6½ feet long, 3 feet deep and 2½ feet wide, and stand about 25 feet apart. The warp as it comes from the first tank to the second is "skied" by running over some rolls in the air, so that about 20 yards are in the air at any given time. As the warp travels at the rate of 33 yards per minute, it is in the air for about forty seconds between the two tanks—that is, between the coupling bath and the first rinse.

Soon after the machine was ready our red business began to increase, and at times it has been a very important part of our work.

Correct Process Finally Determined

Using this apparatus, we finally arrived, after many trials, at the following process. Our standard set of yarn for red consists of three warps of 8 yarn of 378 ends each and 5,000 yards long, whose total weight is about 840 pounds. These warps are wet out by running off the ball through boiling water, and at the same time each one is wrapped separately with a binding thread. They are then doubled to 1,667 yards for dyeing. Each run through the dyeing machine requires about fifty minutes.

Our formula calls for 10 pounds of soda ash and 10 pounds of yarn for boiling out. This is for a second wetting out additional to the first one in boiling water only: 23½ pounds Naphthol AS, 12 pounds dry flaked caustic soda, 18 pounds 75 per cent sulphonated castor oil, 12 pounds Isomerpin and 18 pounds formaldehyde for the prepare, 24 pounds Fast Red G base, 13½ pounds nitrite of soda, 50 pounds hydrochloric acid 20 deg., 18 pounds aluminum sulphate, 25 pounds ground chalk, 5 pounds Isimerpin and 500 pounds ice for the coupling bath, and 80 pounds of soap for cleaning after dyeing.

Now, with the risk of boring you with so much detail, I shall describe rather fully the preparation of the dye baths and the running of the warp.

First start the base solution. Dissolve the nitrite of soda, 13½ pounds, in a wooden keg with four or five pails of cold water. Stir in the Fast Red G base to a fairly thick paste. In a good-sized wooden barrel mix 50 pounds of hydrochloric acid with four or five pails of cold water and 150 pounds of ice. Then stir in slowly the mixture of nitrite and base from the keg and allow to stand, with occasional stirring, for an hour or more. This diazotized solution must be kept cold. The barrel when everything is in should be about two-thirds full.

For the naphthol bath prepare a solution as follows: To four pails of boiling water in a keg add 6 pounds soluble oil and 4 pounds dry caustic soda, and stir in 7½ pounds Naphthol AS. This dissolves quickly to a clear reddish-yellow solution. Then add four parts cold water, 4 pounds Isomerpin and 6 pounds formaldehyde. Put this solution into the dyeing machine and run in cold water until the bath is about 1 foot deep. The volume will then be about 100 gallons. The temperature should be 120 deg. Fahr.

Prepare a second solution in the same manner, using 16 pounds Naphthol AS, 8 pounds dry caustic soda, 12 pounds soluble oil, 8 pounds Isomerpin and 12 pounds formaldehyde. Make up in a barrel to sixteen pails at 120 deg. This solution is for feeding on.

Applying the Base

Give the set of warps one run through a boiling bath containing 10 pounds soda ash and 10 pounds yarn. Then run at once through the naphthol bath, feeding the above solution in two runs of 1,667 yards each. Feed twelve pails for the first run; add three more pails to the bath and start the second run, feeding the remaining during the first fifteen minutes. This is manifestly a very uneven feed, but it seems to give the best evenness in the final shade of any method which we have tried.

The set is now ready for the diazotized base. Add to the solution already prepared 18 pounds aluminum sulphate in concentrated solution. After this has been stirred in, dip out one-half of the solution into a second barrel. This is done on account of the strong foaming which takes place when the ground chalk is stirred in. There should be about nine pails in each barrel.

Mix the 25 pounds of chalk with two parts of cold water and stir carefully into the two barrels, about one-half into each. Put the contents of one barrel into the first tank of the dyeing machine; add water and ice until the machine is about half full. Put 2½ pounds of Isomerpin into the machine and 2½ pounds into the second barrel, and everything is ready for running the set. Feed

the half of the original diazotized solution regularly during one run with plenty of ice. Then make a second run without feed. During these two runs the warp passes through cold running water in the second tank. This completes the actual dyeing.

Make one wash with cold running water in each tank. Make four runs in boiling soap with 10 pounds of soap in each tank and with a fresh bath for each run. Finish for the dryer with a wash with warm running water in each tank.

Troubles Experienced

One of our first difficulties was the appearance of numerous "skips," or undyed places. These were usually found on the surface of the warp, not in the interior, and on a few threads only in any one place, perhaps half an inch long and apparently due to some sort of a resisting or discharging action. At that time we were dyeing without the second wetting-out, and when we began to put in that extra run these skips at once disappeared.

Dark maroon spots or streaks are usually caused by poor squeezing out after coupling; general streakiness may be due to this same cause. Varying depths of shade without much difference in tone usually mean incorrect feeding. If the shade become dull toward one end of the doubled warp, one will suspect decomposition of the base bath.

For some time our sets were doubled to 2,000 yards and we had considerable trouble with 200 or 300 yards of the last end of the set to pass through the base bath coming up light. We were unable to find any method of feeding the solution that would overcome this trouble, and our final resort was to cut the last end off—that is, to double the warps to a shorter length—which proved an effectual remedy.

The greatest defect of this red dyed in this way is that it is not very clean. The fastness to rubbing is not very good, and it has a tendency under certain conditions to stain adjacent cotton or wool in the same fabric. This has been reduced by better squeezing, by running the set through the naphthol in the first tank of the machine and through the second empty tank also so that there is a double squeeze out of the naphthol. A thorough soaping is also a help.

Recently I have tried a rinse in a weak bath of hydrochloric acid at about 70 deg., after coupling and before soaping, with apparent improvement in cleanliness.

Merits of the Process

On the whole, however, the process gives satisfactory results. The shade is full, well penetrated, fairly bright, fast to light, sufficiently level and acceptable by ordinary manufacturing standards.

Besides Fast Red G base, I have used to some extent a scarlet and an orange with good success, but with the garnet I have had considerable difficulty. It gives more trouble than the others, with uneven, streaky dyeings. Naphthol BS with Fast Red G base has given good results.

The naphthol colors in general, I think, make a strong appeal to the cotton dyer by their brilliancy, depth and rather high average fastness. The warp dyer, however, who many times has been brought up on the so-called Scotch system, and who expects to bring his shade up to match by such additions of relatively small amounts of dyestuff as may be required while passing the warp through the dye bath as many times as may be necessary, feels embarassed by his lack of control of his shade with the naphthols. The dyeing is done right or wrong as soon as the yarn gets into the base bath, and the shade can be modified thereafter only with considerable difficulty. If it is too light, one has to begin all over again. Too full a shade can sometimes be lightened a little by severe soaping. Some shades can be changed by dyeing with sulphur colors at moderate temperatures, but there are rather narrow limits to successful dyeing in this way.

If anyone has any questions I shall try to answer them as well as I can; some of my "shop talk" may not have been very intelligible to those members who are not familiar with warp dyeing.

Discussion

At the conclusion of Mr. Haskell's paper the Chairman opened the subject for discussion by the members.

Mr. Pierce spoke of the interest which the subject had for the Section, and introduced R. W. Marsson, who was present from New York, and who is an expert on these colors.

Mr. Marsson spoke briefly and interestingly of the early difficulties which these colors had had in being perfected and in being introduced to the trade, and he also said that most of the early difficulties could now be overcome if the manufacturers would put in the required equipment. In overcoming crocking he spoke of the values of squeezing properly, and suggested the use of an empty box for cooling and squeezing just before going into the developer. In regard to aftertreatment, he said the tendency was to get away from soap and to use soda to remove surplus lake from the goods, it being believed that the soap unduly loosened the lake in the yarns. Mr. Marsson further called attention to the other shades which can be obtained with the naphthols.

Mr. Moran asked if there was any advantage to be gained by drying the goods between the preparing bath and the developing bath—as, for example, the gain in fastness to crocking.

Mr. Haskell replied that there is much difference of

opinion in this matter and that he could not say with definiteness.

Mr. Moran inquired if the goods could not be run into the bath dry and be satisfactorily wet out in the bath. The use of the soluble oil ought to make this possible.

Mr. Haskell believed that it ought to be possible, but that he obtained better results by wetting out two times instead of running in dry or wetting out but once.

There being no further questions brought forward, the Chairman gave the floor to Walter C. Durfee, who gave a detailed discussion of his subject. The character of the paper was such that there could be no written resume which would adequately convey the impresions which were intended. These had to be seen to be appreciated to the utmost.

Dr. L. A. Olney commended both speakers upon the excellent contribution which they had made to the enjoyment and profit of the meeting, and suggested that their example might well be followed by other members of the Section. The presentation of short papers based upon the experience or the researches of the members should prove of great interest.

There being no further discussion, the meeting was adjourned.

[NOTE.—*The following data was furnished by Walter C. Durfee, in reference to his talk on "Color Vision and Classification of Color," before the March meeting of the Northern New England Section.*]

The principal books mentioned in the lecture were: (1) Ridgway's Color Standards and Nomenclature: A. Hoen & Co., Baltimore; (2) Atlas of the Munsell Color System: Munsell Color Company, Baltimore, Md.; (3) Report of the Colorimetry Committee of the Optical Society of America, 1920-21: Prof. E. K. Richtmyer, Cornell University, Utica, N. Y.; (4) Report of the Committee on Color Terminology Questionnaire: Reprinted from Journal of Optical Society of America and Review of Scientific Instruments, Vol. 13, No. 1, July, 1926

The colored glasses are obtained from the Corning Glass Works, Corning, N. Y. Lanterns for experimental work were made by H. Eugene Allard, electrical contractor, Poston.

The first book is valuable for its references and preface and collection of named colors. The second is valuable in showing the relation of one color to another. The third is valuable in indicating the state of mind of the scientific world on the subject. The fourth, the Color Questionnaire, is valuable as indicating the confused state of color language. It warns us indirectly that we are likely to be misunderstood when talking in color terms.

MARCH MEETING OF THE NEW YORK SECTION

The March meeting of the New York Section of the American Association of Textile Chemists and Colorists convened at eight o'clock, Friday evening, March 25, 1927, at the Machinery Club, 50 Church Street, New York City, Herbert Grandage, Chairman, presiding.

After the regular business of the Section was transacted, the Chairman introduced the speaker:

Chairman Grandage—Our speaker for this evening is Dr. Allen Rogers of Pratt Institute. He has chosen for his subject, "The Dressing and Dyeing of Furs." I presume that almost everybody here knows Dr. Rogers, Dr. Rogers! (Applause.)

The Dressing and Dyeing of Furs

By DR. ALLEN ROGERS

Pratt Institute

First I just want to say a little about the history of furs. The fur industry, or the leather industry, of course, is the oldest industry in existence, because it started back in the Garden of Eden. I think possibly one time when I talked to this section on leather I mentioned how that started, but possibly some of you weren't here at that time and I might repeat.

You are all familiar, of course, with the Bible, and you remember in Genesis 3:21 it says, "Unto Adam also and to his wife did the Lord God make coats of skins, and clothed them." So that, of course, puts it down in history as being the first operation of a manufacturing nature that was carried out. Of course, it came about in this way: Adam was there and he got rather lonesome hanging around all alone. He asked the Lord to give him a little company, so the Lord put him to sleep and took out a rib. He rolled up a little clay with it, stuck it up beside him to dry in the sun and when Adam came to he found Eve. They were happy for a little while, until Eve looked around and saw an apple up in the tree. She wanted that apple, but Adam wasn't interested. Finally, like all good, faithful husbands would, he helped Eve up. She got up in the tree, ate the apple and threw him the core and said, "I don't care."

After that, of course, the trouble arose, because every time that Adam went to put on his new suit Eve had used it for salad, so that is why he had to call on the Lord for more permanent clothing.

That establishes the industry back in the Garden of Eden. I am not going away back to that time to start the history of the manufacture of leather and furs, for I especially want to talk to-night a little about furs.

The early cavemen, of course, had to clothe themselves as protection against the elements, and naturally they took

the skins of animals. When the skin is taken off an animal, it soon putrifies, the hair drops out, and, of course, it gets rotten, smelly, and is not suitable for protection. So it was early found necessary to do something to preserve it. There is no doubt that the first method was to take the fat and brains of the animal and rub them into the pelt side and then stretch it and let it dry in. Even in the Iliad we find that the baron with his serfs around dispersed, stretched the water out and drank the unction in, which is the tannage in a modified form, still used to-day in the production of furs. We are doing it in a little different style, but we are still performing the oil tannage. In fact, probably 25 per cent of our furs are oil tanned. About 50 per cent are alum tanned and 25 per cent tanned in other ways.

What we speak of as an Indian-tanned leather or buckskin is an oil-tanned leather. The old Indian tan utilized the oil from the animal, while our ordinary buckskin leather is tanned with the oil from cod, shark and seal

The Fur-Bearing Animals

In passing I will mention a few of the fur-bearing animals. I won't describe all these animals, but I will just run through a few of them, as I happen to have a few skins with me.

The chinchilla is an interesting animal because it is practically extinct and so is very desirable. It is not a pretty skin, and if they were abundant nobody would want a coat made from them.

The chinchilla is a native of South America, and lives at very high altitudes. A gentleman in California several years ago got the idea of going to South America, trapping a quantity of chinchilla and acclimatizing them to the Rocky Mountains. He brought the animals slowly down from the mountain, getting them acclimated at the different altitudes. He was about three months getting them down from the mountain. They were then put on board ship in iceboxes and taken across the equator. Coming across the equator, even though they were in iceboxes, they lost all their hair and some of them died.

When he got them to California he took them into the Rockies, but he had to take them up slowly. Now he is at the proper altitude, and I understand has several thousand.

I might pass this skin around. It is a very common looking skin but it is scarce.

Another very expensive fur is the Russian sable, and I am sorry I haven't any Russian sables to show you. I want to apologize for not having some other skins I expected to-night.

The ermine is another animal that is prized quite highly. The ermine, of course, as you know, is a white animal, commonly called a weasel. In the winter time it is white and in the summer it is gray in color. In winter he has a little black tip on the tail. You know it is ermine by that black tip. Of course, we can make ermine other ways and have the black tip just the same.

Real ermine is an expensive fur. It used to be used as a sign of nobility, but now all the girls have ermine when they want it, although this year is not an ermine year.

The skunk is another valuable fur-bearing animal. We have the regular common everyday skunk that has the white down its back; then we have the black skunk, and then, of course, we take the common everyday skunks and make them into black skunks. The skunk has a very nice long hair. It is used for trimmings. It is not used for garments alone. Skunk is always used on the collars or cuffs.

Sometimes during the taking of the animal it is apt to get more or less odoriferous, and that odor sometimes persists even after the skin has been cleared. Sometimes you can sit down beside a lady in a street car on a warm day, and readily tell she has a skunk collar.

I had an uncle who was a fat, old man. One night he was coming home and a cat (or he supposed it was a cat) ran out in front of him. He gave it a kick. He buried his clothes that night before he went to bed.

Beaver, Mink and Other Furs

Another animal that is quite important as a fur-bearing animal is the beaver. The beaver has its day and then it has its day off. At the present time the beaver is taking more or less of a rest, although real beaver is still expensive and is a desirable fur, but our imitation beaver is so near the real beaver that it is hardly worth while for the beaver to do business. Beavers are more or less of a nuisance in certain places, because if you are building a waterway or a road or something, and the beavers decide they are going to have their home in that locality, they will build a dam and you can do as you please about it. They are quite busy people.

The mink is a fur that is used considerably, especially for trims. Mink skins are quite popular this winter. You will notice that many of the sealskin coats the ladies are wearing have mink collars.

The civet cat fur is sometimes used for trim or for the whole garment. The civet cat is that fur with the black and white spots. The civet cat, as you also know, is valuable because of the excrescence used in perfumery.

The red and gray squirrels to-day are fairly in demand. Formerly the squirrel was not much thought off; it was only used for lining, but this winter you will see a lot of ladies with gray squirrel coats; the gray squirrel makes a very pretty coat. The red squirrel is dyed in different colors. Here is an ordinary squirrel. Here is one dyed black. It hasn't been sheared down, combed or

electrified, but it can be converted into a nice-looking piece of fur.

The muskrat is an animal that is pretty much in demand. Muskrat skins to-day are worth from two dollars to two dollars and a half apiece. We have two kinds of muskrats, those coming from the North and those from the South. The better grade of muskrat skins come from the North. Those from the South are usually used natural, while those from the North are used for making Hudson seal. Later I will speak more about what the Hudson seal is and how it is made; but we do have quite a lot of muskrat skins going into fur coats as natural muskrat.

The fox is always a fur that is in demand. This is an ordinary variety of fox. This one is out of the tan and had the first dusting. It hasn't been electrified. It makes a very pretty neckpiece. The fox lends itself to lots of treatment, because you can convert this fox into gray fox or white fox by bleaching and by dyeing, or into blue fox, or even into black fox, according to what the lady desires.

The wolf is another animal that is used. In the case of wolf, the skin is usually used for the full garment, for heavy coats, especially sport coats. In the same kind of garments we have the coonskin, which a few years ago was a fairly cheap fur, but now that all the cake-eaters want coonskin coats, the price has gone up so that to-day a coonskin coat costs about $500 or $600. At one time nearly all the farmers had coonskin coats because it was the cheapest skin they could have.

The marmot is an animal that gives a fur always more or less in demand.

The mole is used to quite some extent. A moleskin coat is fairly expensive because it takes so many skins. The mole is just like a small mouse. It is the ground mole that is used and it takes several hundred moles to make a coat. It looks like very pretty patchwork, and is very attractive.

Another animal in demand, especially this past year, is the Russian pony. We don't have enough Russian ponies, so we are making the Russian ponies to-day out of calfskins. Here is a Russian pony that is made from a calfskin.

Bear and Leopard

Pearskins are used more for robes and for ornamental purposes and for heavy, driving coats, the black bear, the cinnamon bear and sometimes the white bear. I heard a story the other day about a couple of Irishmen going across the field. They looked around and saw a bull coming. They started to run. There was only one tree in sight. Pat ran up the tree. Mike saw a hole in the ground and jumped into it. The bull ran after him and jumped over the hole. Mike came out of the hole, and just as he got out of the hole the bull came back, and Mike dodged back into the hole and the bull jumped over the hole. After a while, Pat said, "You damned fool, why don't you stay in that hole? We want to go home."

Mike said, "You're a damned fool. There's a bear in that hole." (Laughter.)

Bearskins are quite popular to-day. They are used for coats and other purposes.

This year the leopard is quite a popular fur. This is a real leopard. This is a chrome tanned leopard. You see a lot of leopard coats and tiger coats that are not leopard and tiger skins, but are made from calfskins. This one happens to be a real leopard.

Then we have skins that are popular from time to time, the caracul, the broadtail. This is a broadtail. Sometimes they call them Persian lambs. This is an unborn South American lamb.

The broadtail is usually made from the legs and is clipped down, and it makes that wavy effect. It makes a very pretty coat. The only trouble with the broadtail coat is it is alum tanned and it is a tender grain, and it cracks. Practically all the dyers have trouble with the dyeing of broadtail. There is one concern producing the best broadtail, but they also have their troubles. The caracul and the broadtail are both supposed to be unborn lambs.

There are many other skins used for making furs, but I thought I would talk a little more, especially to-night, of what we might call the commercial furs, that is, furs made on large scales. We don't buy the Russian sable, fox, ermine, and the like, in carload lots. They are picked up by the trappers and brought in. We do have certain furs that are produced for the fur industry and are handled on a commercial basis, regular routine packs going through all the time, just the same as you would tan leather.

The Alaskan Seal

The Alaskan seal is one which very few people know much about. If you will bear with me I will tell you a little bit about the history of the Alaskan seal. We bought a little piece of property called Alaska for a small sum of money, and with it we got a herd of seals. At that time the herd was probably five or six hundred thousand. For years it was customary for people to go there and take these seals, as they congregate in the spring on the Pribilof Islands. Soon after we took over the islands the herd began to diminish, and it got to be serious because it looked as though the herd would soon be extinct. In 1912 the Government put on a closed time and made an agreement with Russia, Japan and England that there should be no pelagic fishing; that is, there would be no fishing for seals allowed in the open water; they must

only be taken on the land, and, of course, as we own the islands, we are the only ones who can take the seals.

A few seals go over to the Japanese islands, but the bulk of the herd of seals that go into the northern water congregate on the Pribilof Islands. These seals arrive on the Alaskan Coast from the middle of March to the first of April. They are now just about starting on the coast. First the bull comes and goes to his harem. He gets the house ready and then in a few days or a week or so his family begin to arrive, that is, his wives. He has anywhere from sixty to eighty wives. They go to a certain spot on the ledges which is just as distinct as if there were a wall there, which is called the harem. All the married men and their harems congregate in their own particular places, while the unattached, bachelor gentlemen, congregate in what is called the rookery, or sort of clubhouse.

It is only the bachelors that are taken for making of furs. They take only the three and four year olds. They are about four or five feet long, and make the best furs. A certain number of bachelors, of course, are allowed to live. They don't kill off all the three and four year olds, and these become bulls, eventually to form harems of their own, and take up the supply of young ladies that are going around. The old bulls, of course, in time get too old to take care of their family, and so young bulls come along and relieve them of the trouble.

They are very knowing animals. The bull is very careful of his family. They raise their family on the coast, and then in August the females start off into the ocean, and by the first of October all of the seals have left the coast.

About two o'clock in the morning they always start the drive on the bachelors. They go to the rookery and scare the seals up onto the beach and then they drive them about 200 yards onto the grass plot where they are killed. They kill them by clubbing. After the animal is killed, the skin is removed and salted down in what we call a kench. The body is then converted into fertilizer stock. The Government owns the seals, pays for the taking of the seals and owns the fertilizer plant.

Treating Sealskins

The skins are salted down and sent to St. Louis, where the Fouke Fur Company have the contract with the Government to dress them. Last year and the year before a few thousand were sold to other people, but it is a difficult proposition to dress sealskins, and they are too expensive for experimentation, so the Fouke Fur Company have the contract with the Government.

The skins are washed and blubbered at the island. The fat is rendered and from it we obtain the seal oil, which is used for the subsequent tannage. When the skins arrive in St. Louis they are washed and put through the dressing process which, of course, first consists in removing the dirt and salt and then loosening what is called the guard hair, or, as they term it, unhairing of the skins. A sealskin has a very thick wool underneath and long guard hairs. A seal, as you look at him, looks almost black. He is dark brown. After these guard hairs are removed the underhair or wool is a very light brown. After the tanning the skins are dusted in sawdust to get rid of the excess of grease, and then dyed. The dyeing of sealskin takes about twenty-eight days. After the guard hair is removed, the dyeing of the skin is all done on a table. They put on a striker, then they put on a dye, and then they dry it. They first dye the tips of the hair, and then gradually dye down into the body of the hair, or what is called the ground hair. After the tip is dyed properly, the whole skin is colored, so that when you blow into an Alaskan seal, you see from the tip a very black right down to light brown as it hits the pelt, and the pelt is almost white. Most people think that seal is black, but it is not. Seal is a light brown but people want it black, and so it is made black for them.

The Alaskan seal, of course, is the queen of sealskins. We had never dressed any sealskins in this country until 1918. Previous to that England had made all the sealskin furs we had.

Hudson Seal and Other Imitations

On account of the beauty of sealskin, because it is a very beautiful piece of fur, women demanded sealskins, but sealskins are very expensive. A good sealskin coat will cost anywhere from $1,200 to $1,500. You can get a sealskin for $800 or $900, but it will be a second grade. It was found that other pelts could be used, and the pelt that offered itself best to this kind of substitute was the muskrat. So we have what is known as the Hudson seal. The muskrat is a gray animal. It has a guard hair and a ground hair. The pelt is tanned with oil, usually cod-liver oil. After tanning with the oil, the pelt is treated in very much the same way that the seal is treated, except in the case of dyeing. The dyeing is usually done in paddles rather than on the table, and we have a very beautiful piece of fur which we know as Hudson seal. A Hudson seal coat costs anywhere from $350 to maybe $600, which is practically half the price of the Alaskan seal.

Of course, women still wanted seal coats and didn't want to pay the price of a Hudson seal, and people interested in the fur business tried to get something to take its place. So we have a sealskin, a seal color or seal dyed coney. A seal dyed coney doesn't mean anything to the lady who buys it, because she doesn't know what a coney is. It is called sealine, Belgian seal, northern seal,

French seal, or anything you want to call it, but if you open up the coat you will find "Seal dyed coney" printed in the flesh side. Coney is the name for rabbit, so that French seals and these other seals are dyed rabbit skins. Dyed rabbit skin to the fur trade is what the Ford car is to the automobile trade. A woman can buy a sealskin coat made from dyed coney or rabbit for from $80 to $100. It looks somewhat like Alaskan seal, but perhaps it won't wear quite as well. When you put it to the test you will find it doesn't have all the beautiful qualities. I will pass this fur around. This is an Australian rabbit. This year it is estimated that we will have 50,000,000 rabbit skins imported from Australia. Probably about 30,000,000 of these skins will go into the hat trade for felt hats. The other 20,000,000 will go into northern seal, or beaver, or permanent wave, or ermine, or southern coon, or any other fur that you happen to want.

Dressing of Furs

The process of dressing furs is a little different from dressing leather, because the first thing, of course, you have the pelt with the hair on it and you mustn't lose the hair; as soon as you get a hair slip on a fur pelt it is practically destroyed. So you have to be very careful in the soaking. Recently with some of the modern preservatives that are coming in, the job has been made very much easier to get a perfect pelt.

After we have the skin well soaked, then the next operation is the curing, which on practically all furs, except sealskins and Hudson seal, is done with alum. The skins are put in a paddle with sulphate of aluminum and salt and sodium bicarbonate, run until the alum has been taken up and then the skins are usually dried out. This is called drying in the crust, which sets the alum. After the skins have been dried in the crust they are returned to the water and sometimes milled with flour and olive oil, or they may be treated with a mixture of mineral oil and cod oil mixtures or soaps; various other things, such as egg yolk are used, to give to the pelt a leathery feel and a condition of leather which will not get hard when it is dyed. It happens that in most cases the fur dresser gets the raw skin and he converts it into a dressed pelt The concern that does that part of it only does the dressing; then the skins are bought by the cloak manufacturer, who sends them to the dyer to be converted into beaver, seal or ermine or whatever he wants.

It is a problem to-day to get a properly dressed skin. This is, however, done with alum and oil, but they do have trouble with the skins getting hard, and then it is up to the dyer to get them soft again, which is done by various treatments in kickers or with oils or in other ways, sawdust and so on. We have to use considerable sawdust in the making of furs, because after the various operations, both in the dressing and in the dyeing of the leather, the hair has to be always clean, and that is done by running the skins in what we call drums with hardwood sawdust. After the drumming with the sawdust the skins are put in cages, and the sawdust is beaten out. They are sometimes caged as many as four or five times, treated, dyed, and then caged again until you get the hair perfectly clean, because in order to dye a hair it must be free from grease. After the dressing, the dyer gets the skin and starts to dye it, and it must be clean.

Dyeing Furs

Most of the dyes used to-day are the developed dyes, paraphenylene, diamine metaphenylene, diamine, etc., compounds developed with hydrogen peroxide. I would imagine that about 50 per cent of the furs are colored with these dyes, which are known in the trade under various names.

In dyeing a fur there are several things to be considered. You must first get the hair clean, free from grease, and then before the hair can be dyed it has to be killed. What we mean by that is that you have got to open up the hair. The hair is scaly. You must open up those scales in order to let the dye penetrate. The kill may consist of various things. Probably the most common kill is sodium carbonate, in the various degrees of concentration, depending upon the fur. Caustic soda is sometimes used as a kill; ammonia is used as a kill; sometimes chloride of lime; sometimes mercuric nitrate, sodium dichromate, potassium dichromate.

The skins are placed in a solution containing the developed dye with the hydrogen peroxide, usually in a slightly alkaline solution. Then after the skins are dyed to the desired shade, they are sometimes topped. If it happens to be a black, they are usually topped with aniline salt, chrome and copper. They are sometimes topped as many as five or six times. After each topping the skins are dusted and caged, in order to clean out the old dye and to bring up a nice shade.

Then we have, of course, a lot of skins that are dyed with other colors, acid dyes, basic dyes, natural dyes, such as Logwood, fustic, and Osage Orange.

Then we have a lot of furs like marmot and fox, and other furs which are kind of dull when you get through the dressing, and to bring up a brilliance they are brush dyed, just to top the hair, called tipping. When you want to get a blue cast on a fox, you give it a little tipping. Sometimes they are dyed one color and then the dye is stripped with a bleach. There are a lot of tricks that are done with furs, the same as you do with textiles, but in every case the hair has to be killed; it usually has to be mordanted and then dyed.

This is a rabbit. It has not been in the sawdust yet.

If you blow in this rabbit you will see it is very dark underneath. To get a nice light shade on rabbit you must have a white ground. That is a peroxide bleach on there and underneath it is perfectly white. You don't have to worry about the bottom being too dark.

Meeting the Demand for Fur Coats

The fur industry has been in vogue from the time of Adam and Eve, but these are times when there is more demand for furs than other times. The reason for this is that in the past probably people couldn't afford furs, but now there is no reason why every lady shouldn't have a fur coat if she wants it, because fur coats can be had very reasonably. In order to meet this demand we have taken commercial products like the calf, which can be raised in any quantities; rabbits, which can be raised in any quantities, and then there are many fox farms throughout the country. The Government has in Alaska a blue fox farm, which to-day is one of the most expensive of the fox furs, and people are going into the industry of raising animals for their furs. Up in New Hampshire there is a big skunk farm. They are making a pretty good profit from it. Some fellow proposed using cat skins, but they have never been very popular. You probably have heard of that fellow's scheme—raising rats and feeding the bodies of the rats to the cats, and then skinning the cats and getting their furs and throwing the cats back for the rats to eat. His idea, you see, was quite an economical one. That is like a friend of mine who had some chickens that were self-supporting—they were eating their own eggs. I think this cat farm would be about the same thing.

I have been quite a farmer myself. I raised peppers down in Florida. I lost $750 raising peppers. I have never got into the fur business, but I think I could lose some money in that, too. If you are really careful, there is some money in the fur business.

I would say the things to raise would be fox and skunks, but don't raise rabbits, because you can buy rabbits cheaper than you can raise them; but you could raise Belgian hares, and Belgian hares are being cultivated, so to speak. Somebody may some time raise leopards, but that doesn't seem to have entered the mind of anybody yet, because we don't really have to do it as long as we have calves.

I think I have talked a little too long to you gentlemen. I certainly enjoyed my dinner to-night, enjoyed meeting you, and if I have told you anything about furs that is interesting I am very glad, although I am afraid the story is more or less of an old one to you. If there are any questions I can answer I will be glad to do it. (Applause.)

Discussion of Fur Dyeing

Mr. Knowland—Can you tell us whether anything has been done with the penguin at all?

Dr. Rogers—Nothing has been done to amount to anything.

Practically the only real herd of seal is the one on our Alaskan coast. There is a big herd on the coast of South America that should be given some attention, but the South Americans take the seals by pelagic fishing, and by the time they get the skins up to this country they are rotten. There is also a herd on the west coast of Africa. Nobody discovered that until about three or four years ago, so that may make another source for the sealskins.

Mr. Blake—What is nutria?

Dr. Rogers—Nutria is a South American beaver.

Mr. Blake—That is the correct name?

Dr. Rogers—Yes. The nutria has a little longer hair than these beavers.

Mr. McKinney—What do you mean by electrified?

Dr. Rogers—Skins are put on a machine that brings up the nap, and it is called electrifying. It is a sort of static arrangement. I don't think there is very much static; I think it is more the blowing than anything else. In the trade it is called electrifying.

Dr. Harold—Is it possible to bleach furs to a true white?

Dr. Rogers—No. It is like a bleached blond. You never see a bleached blond with true white hair. It is yellowish. I have had perfectly white Chinese hair which was supposed to have been bleached. On furs it isn't real white, it is like a tow-head.

Dr. Harold—Has anybody ever identified that residual color that it is impossible to bleach?

Dr. Rogers—Not that I know of. If you look at it under a microscope, it is a very interesting thing in rabbit fur. There are some little hard hairs around the neck where the rabbit goes under the fence—it is like corns on the hair. The dyer has a lot of trouble with those little spots. You can see the calluses on those hairs under the microscope. It is almost impossible to dye them.

Mr. Skinner—Could you tell us how they bleach furs so as to avoid destroying the leather?

Dr. Rogers—I can and I can't. This is a bleached fur. You can see the strength of the leather is there. It was bleached with peroxide and it is an alum-tanned pelt. That is a pretty strong pelt. I am sorry I can't tell you exactly about that.

Mr. Schaumann—How do they produce the spots in the imitation leopard?

Dr. Rogers—That is done with a stencil.

They bleach the skin; the usual method is to take a silk bolting cloth and this is put on a frame. Then you

take a pyroxylin mixture and spread it on, the same as you would put a Duco finish on your automobile. After you have that spread on the silk you put on a plate like a printing plate and print any design that you want. You put it on there and pull it off. The Duco lacquer comes off with it and leaves the spots. Then the skin is put on the table and this stencil is put on top of it, and then you spread your color over that. Of course, the color goes through and hits the hair. The hair has been mordant-dyed first. You can use acid or vegetable colors. What they usually use is a developed color and let that run over the stencil, then take off the stencil and in a little while it begins to develop the same as a woman dyes her hair when she is light-headed and wants to become a brunette.

Mr. Jenkins—Could you tell me how to bleach a gray squirrel without hardening the skin?

Dr. Rogers—Yes, I could. (Laughter.)

Mr. Jenkins—Or can you?

Dr. Rogers—Yes, I can. It is not a hard thing to do. The trouble in the fur trade has been that the dyers have not been the dressers and the dressers have not been the dyers. The dyer takes the pelt, and then if it goes wrong he says the fellow didn't tan it right; then when the fellow who tans the skin gives it to the dyer and the dyer spoils it, the tanner says he didn't know how to dye the skins or he wouldn't have spoiled the pelt. So if the dyer knew how to keep his leather from getting hard he would have no trouble.

If you want to send me some squirrels I will bleach them for you, using your own peroxide, and keep them soft.

Mr. Jenkins—After the bleach do you use an after-treatment?

Dr. Rogers—Yes, sure.

Mr. Jenkins—Dr. Rogers, could you tell us anything about chrome tannage on furs, as to whether the leather can be made soft?

Dr. Rogers—This leopard is a chrome tanned. With the chrome-tan you can't get the same soft condition that you do with an oil-tan or alum tan, because a chrome tannage is a firm tannage. They are tanning a lot of calf in chrome, and it is a wonderful thing if you can do it. The great advantage would be that you could use acid colors or direct colors on the fur if you could only heat it, and you could heat it if you could chrome it, but when the furrier gets this and starts to make a garment, he wets it and wants to pull it. You see there is no stretch in that at all, while there is a lot of stretch to this skin. If that skin was chrome-tanned, it would be like a piece of cloth —it wouldn't stretch. Up to date nobody has really got a chrome-tanned rabbit or any other fur that has the stretch to it. You can make a very stretchy piece of leather with chrome if you are going to make a glove leather because you can put the skin in the lime, lime it and open it up, but you can't put a fur in the lime because the hair will come off.

Another way that was tried was to heavily fat-liquor it, put in a lot of sulphonated oil to get the stretch, but you don't get it. Up to date I have never seen a good chrome-tanned fur. You can get them to look pretty and feel soft, but they haven't got the feel that the furrier wants. He wants it to stretch.

Chairman Grandage—Are there any more questions? I am quite sure we have all enjoyed Dr. Rogers' talk.

Mr. Scott—I move that a rising vote of thanks be extended Dr. Rogers.

. . . The motion was seconded and carried and a rising vote of thanks was given Dr. Rogers. . . .

Chairman Grandage—Our next meeting will probably be held in New York. The date will be announced later.

. . . The meeting adjourned at nine fifteen.

Applicants for Membership

Active Membership

Baumann, Fred, dyer and chemist, Sussex Print Works, Newton, N. J. Sponsors: Wm. Milne and E. J. Zillessen.

Minikin, Leonard, chemist, Sussex Print Works, Newton, N. J. Sponsors: Wm. Milne and E. J. Zillessen.

Stanton, Frederick, colorist, Sussex Print Works, Newton, N. J. Sponsors: Wm. Milne and E. J. Zillessen.

Turner, M. M., colorist, Mallory Hat Company, Danbury, Conn. Sponsors: D. P. Knowland and Arthur F. Wiehl.

Junior Membership

Swenson, W. L., assistant to general sales manager, General Dyestuff Corporation, New York City. Sponsors: Geo. H. Alpers and E. L. Bickrell.

MARCH MEETING OF LOWELL TEXTILE JUNIOR SECTION

The March meeting of the Lowell Textile Junior Section was held on March 10, 1927, at the Lowell Textile School. The secretary's report was read and accepted. Chairman S. Meeker then introduced the speaker of the afternoon, Mr. Platt, superintendent of the works of the American Cellulose & Chemical Company, Ltd., Cumberland, Md. The subject of Mr. Platt's address was: "Celanese and SRA Dyes." Mr. Platt had with him many samples of Celanese and mixtures of Celanese and silk dyed with various colors that illustrated his talk admirably.

Upon the completion of his address, the members gave Mr. Platt a rising vote of thanks, and the meeting was adjourned.

B. GLICKMAN, *Secretary.*

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

CLAYTON HOAGLAND
Managing Editor

MYRON DREW REESER
Advertising Manager

Published biweekly by
HOWES PUBLISHING CO., INC.
90 William Street, New York City

A. P. HOWES, *President* E. S. PREDMORE, *Secretary*

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00

Vol. XVI April 18, 1927 No. 6

TIME TO PROVIDE FOR RESEARCH

WHEN an industry is ill it becomes almost human. Be its ailment ever so slight, in its eyes that ailment assumes a deadly form and all else is neglected in the restless, dispairing search for a cure. The industry lapses into what may best be called a "blue funk," and in this condition is able to put its mind only to the most practical and immediate concerns, while it hopefully hugs the idea that its nausea will soon pass and the good old days will soon return. It is then that its ears are shut to the free advice of pseudo-economists, theorists and their ilk and, above all, to any discussion of its future plans.

An industry in the throes of depression cannot easily be approached with any schemes for its development, no matter how workable those schemes may be. At such a time, when even the outlook of its leaders is out of perspective, almost any plan seems visionary. It is extremely unwise and futile to talk to it of anything so remote from its thoughts as technical research. For this reason devotees of textile research have received but mild response to their theories during the past three or four years. Many have learned that the best policy was to pursue their good work silently and under cover, provided they had the funds to work.

But the textile industry is rapidly convalescing. The idleness, the gloom, the impatience and discouragement that skulked among the mills a few months ago gradually have retreated before a swelling song of work. Only the woolen districts remain under a slight pall. The cotton and silk branches of the industry have found ample reasons for enlarging upon the operating schedules they laid out as soon as the return to normal began. Mill consumption of cotton during February reached its highest daily rate on record, and unfilled orders at the close of that month were 62.6 per cent greater than one year ago.

With the return of its old vigor and its old hardy spirit, those who are honestly concerned with moulding the future of the textile industry shall do well to stir up among the lethargic element a livelier interest in that engrossing subject of technical research. The industry should now be far more receptive to such ideas than at any time in its history. For while it struggled in its slough of despond and idleness it saw other industries, busy and prosperous, toiling day and night in laboratories, solidifying dreams into realities; heard the "Eureka" of the chemist ring out over each new achievement; saw new enterprises reared upon ground where only theories once existed; saw, too, the crumbling factories of those who spurned the chemists' aid and clung blindly to their old ideas.

Textile mills should soon be able to give more of their crowded attention to research plans, that the revival they are now experiencing may be lengthened into uninterrupted prosperity. The industry has had more than its share of distress. It has had more than sufficient reason to worry over cold financial problems involving rent and upkeep and labor. It has to some extent been justified in its indifference to research. But now that normalcy has all but returned there is no reason in the world why mills should not make liberal provision for financing the many worthwhile research programs that have been worked out for them. Procrastination will never add one penny to the industry's wealth. Research will.

THE GROWING CONSUMPTION OF VAT COLORS

THE most important fact in the advance report on the latest Dye Census is that last year more than four million pounds of vat dyes were produced in this country. Considered from one angle, that is the most encouraging news about the American dye industry that has been heard in many months. Both dye manufacturers and mills should feel elated over this clear evidence that the fast color demand is at last being accepted as a fact by the textile industry.

For the past six years vat colors have been consumed in increasing quantities. In 1920 the consumption total was but slightly more than 1,900,000 pounds. By 1925 this had swelled to over 5,000,000 pounds. Last year's consumption, based on the record production given above, should be well over 6,000,000.

Textile mills have come to realize that in order to hold their place they must satisfy the demand for faster goods. But fine as their response to this idea has been, it would be even greater if in their choice of dyestuffs they were guided by the thought that the cost of the dve is a mere fraction of the total cost of a yard of fabric.

Why are mills dyeing more goods with fast colors? Merely because they are following consumer demands. Their use of vat dyes, we feel sure, is not generally based on a knowledge of dye costs in relation to the cost of goods. If more mills realized that the vat color in a

madras shirt, for example, costs only one cent, or but a trifle more than a fugitive color used for the same purpose, they would unhesitatingly choose the faster color every time.

Every mill man who orders dyes should study that section of the last Dye Census which contains the data on the cost of dyes in representative fabrics. Copies can be obtained at small cost from the Government Printing Office.

PATERSON'S DYEING INDUSTRY GROWING

The dyeing, printing and finishing trades of Paterson have recorded a steady growth in the past quarter century, both in the number of workers employed and in the amount of business handled. The industry employs 11,231 people, according to a list compiled recently by the Paterson Chamber of Commerce.

The growth of the industry is further indicated by the fact that the Government figures for 1899 show that 2,882 people were employed in the industry in Paterson during that year. The industry to-day employs about five times as many people.

The annual value of product of the Paterson dyeing industry in 1895 was $3,836,000. The latest available figures for 1923 show a value of product of $20,386,000. However, the Government figures include only those plants within the corporate limits of the city, and the inclusion of plants located in the suburban towns in the Paterson district would add materially to this total. Of course, "value of product" in the dyeing industry means the value added to the goods by the dyeing process.

PRATT CHEMISTS TO GAMBOL AT ANNUAL DINNER

All loyal and true members of the Pratt Institute Chemical Alumni Association and their friends will gather in the Green and Blue Room of the Hotel McAlpin, New York, next Thursday evening, April 21, for the twenty-eighth annual dinner of the association. The committee has outdone all previous efforts in preparing the program of this notable affair, and promises some unique entertainment. The get-together feature of the dinner alone, it is pointed out, should be sufficient attraction for those Pratt men in the chemical trades who have been isolated from their brethren for twelve long months.

RAYON FROM CORNSTALKS INTEREST PROMINENT MEN

The commercial production of rayon from chemically treated cornstalk pulp has at last been made practical, according to an announcement issued recently by C. B. Roberts, president of the C. B. Roberts Engineering Company.

Exhaustive research has been carried on with the process invented by a Hungarian chemist, Dr. Bela Dorner, and the results have produced a chemical pulp of high quality for the production of artificial silk, paper, films, explosives and other cellulose products. The entire stalk is ground and treated by this process.

The Roberts firm made the investigation for a group of New York capitalists and based its favorable report on the work of Dr. John E. Jackson, research chemist.

The American rights to the process were obtained by a group which includes Victor Berman, president of the Onyx Oil & Chemical Company; Lewis L. Clarke, chairman of the executive committee of the American Exchange Irving Trust Company; Carl B. Ely, president of the Tannin Corporation; F. L. Fuller, Liggett & Myers Tobacco Company; J. C. Van Eck, president of the Shell Union Oil Corporation; W. Jule Day, H. C. Merritt, H. H. Scott, F. W. ter Meulen and S. B. Thorne.

WORLD USING MORE COTTON

World mill consumption of cotton was the largest on record for any half-year period in the six months ended January 31, according to a cablegram just received from the Federation of Master Cotton Spinners' Association, of Manchester, England, by the Department of Agriculture. The quantity consumed was placed at 12,934,000 running bales, an increase of about 5 per cent over the corresponding period a year ago and an increase of about 5 per cent over the preceding six months of 1926.

Consumption of American cotton reached 7,224,000 bales for the six months, compared with 6,974,000 bales for the corresponding period a year ago.

World mill stocks of cotton of all growths on January 31, 1927, were 4,681,000 running bales or about 5 per cent higher than six months ago and about 5 per cent higher than a year ago. World mill stocks of American cotton are reported at 2,988,000 running bales compared with 1,969,000 bales on July 31, 1926, and 2,862,000 bales on January 31, 1926. Stocks of Indian and Egyptian cotton were less than six months ago and a year ago, while stocks of growths other than American, Egyptian, and Indian were slightly greater than six months ago but less than a year ago.

DYEING AND CLEANING INSTITUTE APPOINTS DIRECTOR

The National Institute of Dyeing and Cleaning made important personal appointments at a recent meeting of its executive committee. The Institute, located in Washington, is controlled by the National Association of Dyers and Cleaners.

C. C. Hubbard has been engaged as director of instruction and research, and Ivan M. Tull as general manager. Mr. Tull is present general manager of the National Association. Messrs. Hubbard and Goldman, present research associates at the Bureau of Standards, will compose the staff of instructors during the first terms.

Mr. Hubbard was assigned a task by the research

committee (which is also the executive committee of the Institute) to prepare another textbook on cleaning and dyeing during the forepart of this year. It is likely that Mr. Hubbard's new book will be ready for publication by autumn of 1927, since it is to be used as a text in student instructions.

Two major problems for research in plant methods were decided upon and have now been given to the administration of the Bureau of Standards for consideration. If they are approved, announcement will be made to the industry immediately of the subjects to be studied.

Provision was made for the research staff to devote some time this year to study of color problems met in dry-cleaning. The plan provides for a test of the standard colors in the process of dry-cleaning, with conferences to be held among the silk dyers, color card association, and the manufacturers of dyestuffs, with a view to making colors adopted by the textile industry fast to dry-cleaning if used in the manufacture of dress fabrics.

NEW PRESIDENT OF SILK ASSOCIATION

H. Schniewind, Jr., president of the Susquehanna Silk Mills, was elected president of the Silk Association of America, Inc., at the annual meeting of the board of managers.

Mr. Schniewind, who succeeds George A. Post, was association vice-president from 1910 to 1920, and a member of the board from 1908 to 1923, to which office he was again elected in 1924.

The vice-presidents were returned to office, as was also the fifth member of the executive committee. These are in the order named: E. J. Stehli, Robert J. F. Schwarzenbach, Albert Forsch and H. Morton Merriman.

Eight members of the board to succeed those whose terms expire were elected according to the recommendations of the nominating committee, as follows: Albert Forsch, Thomas B. Hill, C. Muller, Lionel F. Straus, H. Schniewind, Jr., E. J. Stehli, A. D. Walker and M. K. Yorks.

Reviews of the silk business for the year were presented by members engaged in various divisions, such as raw silk importing, throwing silk, silk manufacture, dyeing and factoring, the majority of them giving constructive views on avoiding the overproduction of 1926.

The improvement in industrial conditions was outlined by Secretary Ramsay Peugnet in his report showing the association's achievements in giving to the trade tests and grades for raw silk qualities, preparing formulas for washing silks and testing washfastness, the formation of rules governing commission throwing and specifications on domestic raw silk waste, and in improving silk raising in the East and in Europe.

KNITTING ARTS SHOW BEST IN HISTORY OF TRADE

Hundreds of prominent knit goods manufacturers came to Philadelphia from all over the United States and Canada, and from abroad, during the week of April 4, to attend the Twenty-third Annual Knitting Arts Exhibition and annual convention of the National Association of Hosiery and Underwear Manufacturers.

This year's Knitting Arts Show, it was enthusiastically declared by the trade, was decidedly the livest, most interesting and successful exhibition ever held by the knitting industry. When the Commercial Museum opened its doors at noon on Monday, April 4, to admit visitors, a large majority of the machinery exhibits were whirring in full operation. During the entire week, particularly in the afternoons and evenings, mill executives and employees and the general public crowded the aisles and gathered in the booths to see the latest developments in the art of knitting—developments both mechanical and chemical.

The expansive hall of the museum was brilliantly lighted and artistically decorated in the city's colors, and each individual exhibit was in itself a masterpiece of the displayer's art. Due largely to the expert management of the exhibition, which was again under the direction of Chester I. Campbell, the activities of the week were not marred by a single unfavorable circumstance.

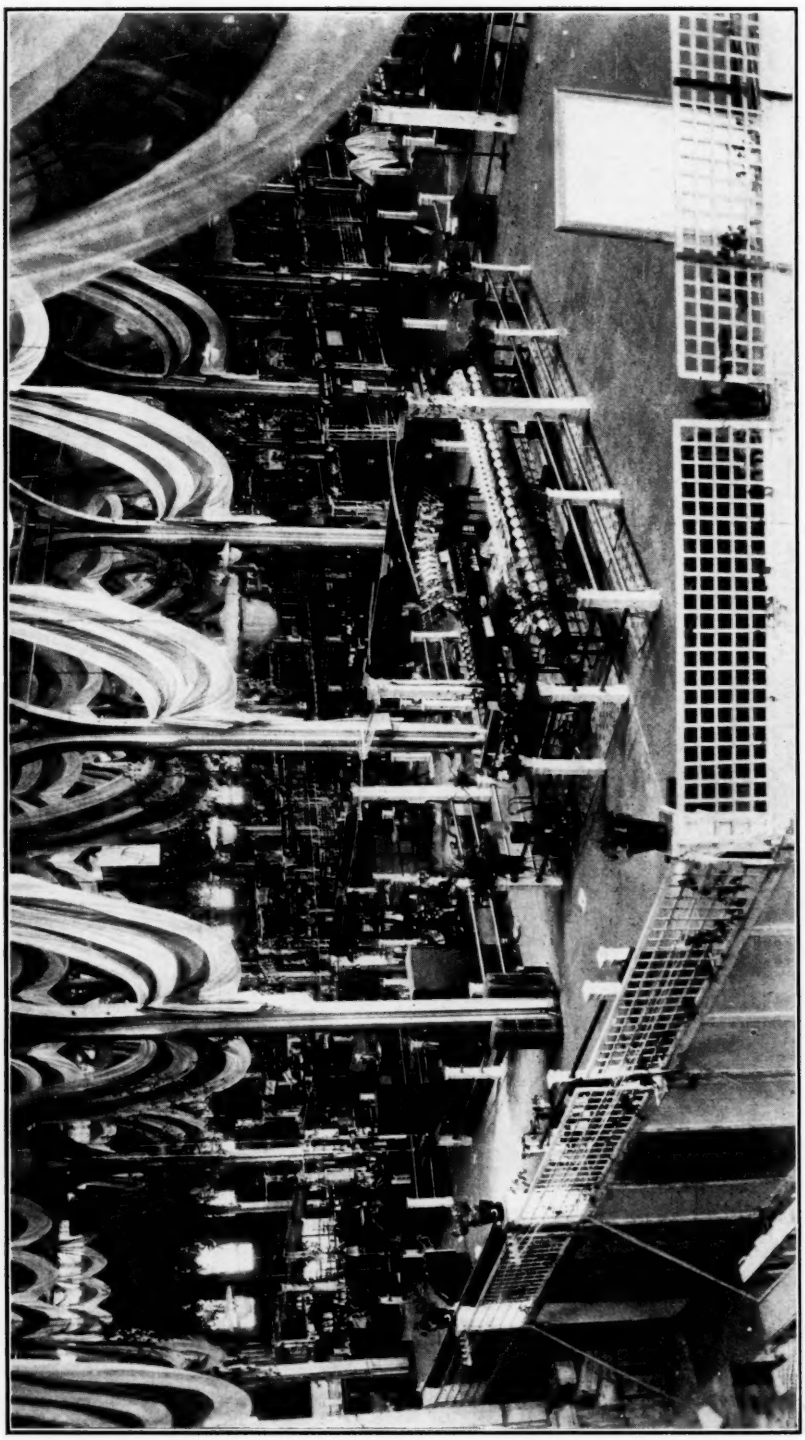
Most of the exhibitors had something new to show in the way of machinery and materials as visual evidence of the notable progress made by the knitting industry in one short year. New devices, apparatus and equipment were features of scores of displays, in addition to the exhibits of standard machinery for the knitting mill.

The moving machinery, as usual, attracted the largest crowds during the week. More than two hundred concerns were represented, occupying 350 exhibits, and the products on display comprised all types of hosiery, underwear, sweater and Jacquard machines, winding machinery, and dyeing, finishing and drying equipment, all in operation. There were, besides these larger attractions, the smaller exhibits of various mechanical devices, yarns, mill supplies and processing oils, chemicals and colors.

The following brief descriptions of exhibits are intended merely to be representative of the displays of dyeing equipment, dyes and textile chemicals:

H. W. Butterworth & Sons Co., Philadelphia

Butterworth and Klauder-Weldon hosiery dyers, paddle wheel and rotary type, all-metal skein, machine. Several sizes of rotary machine exhibited, the cylinder construction of which is unique and a departure from the usual construction. It is designed to act with gentle action on goods and levelness in coloring on goods. New paddle wheel shown; construc-



Bird's-eye View of Twenty-third Annual Knitting Arts Exhibition Held in Commercial Museum, Philadelphia, During Week of April 4. More Than 350 Booths Were Occupied, Representing 200 Manufacturers of Knitting Machinery, Dyeing and Drying Equipment, Yarns and Supplies.

tion such that goods are protected in action. Small model of all-metal skein machine, in which the yarn carrying a reel closely follows previous K-W designs, but is equipped with all-metal tub and top construction and mounted on cast-iron frame. In attendance: Harry W. Butterworth, Sr., president; A. W. Butterworth, vice-president; Harry W. Butterworth, Jr., secretary; De Haven Butterworth, assistant secretary; Henry Higgs, Harry Lounsbury, Frank Q. Miller, William Yates; W. J. Brown, superintendent of Klauder-Weldon plant at Bethayres, Pa.; W. E. H. Bell, manager of Bethayres plant.

E. I. du Pont de Nemours & Co.
Wilmington, Del.

Complete line of dyestuffs for coloring all classes of hosiery, knit goods and rayon. Among the new features shown were dyeings and formulas for the popular shades on silk and cotton hosiery; also dyeings of the individual colors used and of the various lines of knit goods dyed with products of this company. In attendance: Clarence C. W. Wilson, manager of the Philadelphia dyestuffs department; R. A. Carter, C. L. Hammell, W. B. Thompson, W. C. Beattie, W. G. Hamlen, Jr., R. G. Franklin, H. Krug, J. McNamara and J. Carl Schmidt.

International Nickel Co., New York

Monel-metal in its commercial forms, such as used in the manufacturing of textile and dyeing equipment. Exhibited Monel-metal framed panels in its various mill forms, such as sheets, rods, tubing, forgings and castings, also specimens in fabricated form and Monel-metal and nickel accessories. Ten enlarged Monel-metal framed photographs depicting installations of Monel-metal dyeing equipment in many different branches of the textile industry, showing wide adaptation of Monel-metal. In attendance: E. A. Turner, W. J. Calnan, M. P. Saunders, J. F. Smith and G. Rausch.

Kali Manufacturing Co., Philadelphia

Chemical specialties for the textile industry. Kalisine, for finishing chiffon hosiery; Hydroxy Boil-Off Oil for pure silk; Three-Fiber Boil-Off for art silk and pure silk; Hydroxy Sulphonated Oils; Developene and Kalite, a hydrogen peroxide, featured. Samples displayed of knitted hosiery, outerwear and underwear processed with Kali chemical products. In attendance: James Branegan, president; S. G. Davenport, secretary and treasurer; J. J. Donlen, Walter Phipps, Russell Harris, Eugene Wall and Harry Neisser.

National Aniline & Chemical Co., New York

Very attractively planned display of silk hosiery dyed with National dyes. In attendance: Dr. Louis J. Matos, George Gilbert and William Scholler.

Oakite Products, Inc., New York

Oakite for kier boiling, wool scouring, fulling and degumming. Display of finished hosiery, underwear and piece goods that had been processed with Oakite. Literature on textile processing distributed. In attendance: Technical men and field service representatives.

Permutit Co., New York

Model of Permutit water softener and filter operating CO_2 combuustion indicator. This model about 4 feet long and made exactly to scale after the design of a large commercial unit that delivers 100,000 gallons per day. Even the pipes and strainers in the interior of the water-softening tank reproduced in miniature. The Renarex instrument, also exhibited, operates upon a purely mechanical principle which avoids possibility of delicate parts breaking. In attendance: M. F. Corin, D. J. Hess, W. L. Lowrie and J. S. Shedden.

CHEMICAL INDUSTRIES EXPOSITION

At the meeting of the advisory committee of the Chemical Industries Exposition held recently at the Chemists' Club, numerous details of the coming exposition to be held at the Grand Central Palace September 26 to October 1, inclusive, were planned and discussed at length.

The students' course which will be conducted during the week of the exposition is divided into two groups, the first or elementary group and the second or advanced group. The speakers on the course will comprise such men of note in the field of chemical industry as Dr. Arthur D. Little; H. E. Howe, editor Industrial and Engineering Chemistry; William Haynes, president Drug and Chemical Markets; Dr. Charles H. Herty; Arthur Wright, Filtration Engineers, Inc., of New York; S. B. Kanowitz, Raymond Bros. Impact Pulverizer, of New York; W. A. McAdams, Massachusetts Institute of Technology; Otto Mantius, New York; A. E. Marshall, Corning Glass Works, New York; E. J. Sweetland, United Filters Corporation, New York; H. N. Spicer, The Dorr Company, New York.

Many new features are being planned for this coming exposition. One of interest is the change in policy which will admit exhibits of foreign manufacture for showing in the exposition. This change has been made because the American chemical industries are now in such a position that exhibits of foreign products would prove stimulating and at the same time give American manufacturers an opportunity to see what European manufacturers are doing. This change will doubtless bring about a closer relationship in the industry and enable American manufacturers to see and study a number of products and developments of European manufacture that are not produced in the United States.

American Dye Production Further Increased in 1926

Prices Declined—Vat Dyes Reach New Peak—Imports Record Drop

OVER 4,000,000 pounds of vat colors came from the plants of American dyestuff manufacturers last year, as compared with 2,600,000 pounds in 1925. Domestic dye production as a whole, however, recorded an increase in 1926 of only 2 per cent by quantity, with a total of about 88,000,000 pounds and a value of approximately $37,000,000.

These statistics were compiled by the United States Tariff Commission as part of its work of issuing the annual Census of Dyes, and are included in an advance report given out a few days ago. According to the commission's preliminary survey of the industry, the total sales of dyes in 1926 were about 86,200,000 pounds, valued at $36,300,000. This is an increase of 8.7 per cent by quantity and a decrease of 3 per cent in total value as compared with 1925. The increase in volume of sales is largely due to a slight improvement in the activity of the textile industry. The exports by quantity show practically no change from those of 1925.

Developments from year to year since 1917 in the domestic manufacture of dyes and other finished coal-tar products are unparalleled in the history of the American chemical industry. In 1926 there was notable progress in the manufacture of specialty and fast dyes. Many new colors of high fastness were produced for the first time in this country during that year.

The increase in domestic production of vat dyes is of interest to every consumer of fabrics as indicative of the pronounced trend toward a greater use of fast dyes for "fast dyed" fabrics.

TABLE I

Domestic Production and Sales of Coal-Tar Dyes

Year	Production Pounds	Sales Pounds	Sales Value
1926	88,000,000	86,268,000	$36,312,000
1925	86,345,438	79,303,451	37,468,332
1924	68,679,000	64,961,433	35,012,400
1923	93,667,524	86,567,446	47,223,161
1922	64,632,187	69,107,105	41,463,790
1921	39,008,690	47,513,762	39,283,956
1920	88,263,776	.....	.....
1914	6,619,729	.....	.....

One of the outstanding features of the year was the continued decline in dye prices, which was due to the severe competition between domestic manufacturers.

The imports of dyes in 1926 recorded a decline which was 12.4 per cent by quantity and 14.4 per cent by value from that of the previous year. The imported dyes, which supplied about 7 per cent by quantity of our consumption, are very largely the higher cost types imported from Germany and Switzerland. Exports of dyes recorded practically no change in quantity but a decline of 11 per cent by value from that of 1925.

Further Decline in Domestic Dye Prices

The weighted average price of all domestic dyes sold in 1926 was 10 per cent less than the average of 1925. The following table shows the trend of the average prices of domestic coal-tar dyes in recent years:

Year	Weighted Average* Price of Domestic Sales Dyes (per pound)
1926	$0.42
1925	.466
1924	.54
1923	.545
1922	.60
1921	.83
1920	.99
1917	1.26

*Total value of all dyes divided by the total quantity.

Price recessions were recorded for both low and high priced dyes. Indigo, the leading color manufactured in this country, shows an average sales price of 12.8 cents per pound in 1926, as compared with 15.6 cents in 1925 and $1.42 per pound in 1917, when the first Indigo was produced in the United States. This is below the pre-war price, when our entire supply was imported from Germany and Switzerland.

Dye Imports Decline

The imports of dyes during 1926 were 4,658,464 pounds, with an invoice value of $4,101,252. This represents a decrease of 12.4 per cent by quantity and 14.4 per cent by value from that of 1925. Total imports in 1914, when our consumption was very largely supplied by imports, amounted to 45,950,895 pounds. Since September 22, 1924, when the ad valorem duty on dyes and other finished coal-tar products was reduced from 60 to 45 per cent ad valorem, there has been an increase in the imports, particularly of the vat dyes, certain acid, acid alizarine, and other high cost specialty types, which have been almost entirely of German and Swiss manufacture.

TABLE II

Imports of Coal-Tar Dyes into the United States

Period	Pounds	Invoice Value	Monthly Average Pounds	Monthly Average Value
1927 (total for 3 mo.)	913,611	$801,165	304,537	$267,055
1926	4,658,464	4,101,252	388,205	341,771
1925	5,315,158	4,791,908	442,930	399,326
1924 First 9 months	1,611,931	1,642,632	179,103	182,515
Last 3 months	1,410,608	1,266,146	470,203	422,049
Total	3,022,539	2,908,778	251,878	242,398
1923	3,098,193	3,151,363	258,153	262,614
1922	3,982,631	5,243,257	338,850	436,838
1921	4,252,911	5,156,779	354,409	429,732
1920	3,402,582	5,763,437	283,548	480,286

Relation of Production to Consumption

The imports of coal-tar dyes in 1926 were 5.2 per cent of the total production by quantity and 11 per cent by value. They were by quantity over 7 per cent of the apparent consumption, assuming this to be equivalent to production plus imports, minus exports. The dyes manufactured in the United States, based on preliminary figures, accordingly supplied about 93 per cent of apparent consumption by quantity. By value, however, domestic production would be considerably less than 93 per cent of consumption, as the average price of the dyes imported is much higher than the average price of the domestic production. There was an exportable surplus of certain dyes, including Indigo and Sulphur Black.

Decline in Value of Exports

The total exports of coal-tar dyes in 1926 were 25,811,941 pounds, valued at $5,950,159. This represents a slight increase in quantity, but a decline of 11 per cent by value from that of 1925. The drop in value is due to the gradual lowering of prices in the world's export markets which has resulted from the severe competition offered by German and Swiss dyes.

TABLE III—Domestic Exports of Dyes

Year	Pounds	Value
1920	.....	$29,823,591
1921	.....	6,270,139
1922	8,344,187	3,996,443
1923	17,924,200	5,565,267
1924	15,713,428	5,636,244
1925	25,799,889	6,694,360
1926	25,811,941	5,950,159

PRELIMINARY SUMMARY OF PRODUCTION AND SALES OF COAL-TAR PRODUCTS, 1926

Finished Products	Sales—Pounds	Sales—Value	Production—Pounds
Dyes	86,268,000	$36,312,000	87,991,000
Color lakes	11,425,000	6,023,000	11,796,000
Photographic chemicals	387,000	505,000	393,000
Medicinals	3,575,000	6,687,000	3,679,000
Flavors	2,629,000	1,482,000	2,858,000
Perfumes	1,678,000	750,000	1,870,000
Synthetic tanning materials and synthetic phenolic resins	14,325,000	7,647,000	14,107,000
Total	120,287,000	59,406,000	122,694,000

PRODUCTION AND SALES OF PRINCIPAL DYES FOR THE YEAR 1926

Col. Index No.	Schultz No.	Name of Dye	Sales—Pounds	Sales—Value	P'duct'n Pounds
17	68	Spirit Yellow R	42,600	$38,454	40,700
19	32	Butter Yellow	21,800	15,700	.....
20	33	Chrysoidine Y	764,000	261,853	813,500
21	34	Chrysoidine R	187,300	67,617	176,200
24	36	Sudan I	49,900	37,400	55,600
27	38	Orange G	149,800	66,600	131,300
30	41	Fast Acid Fuchsine B	17,600	8,961	.....
31	42	Amido Naphthol Red G	152,400	70,866	127,800
36	48	Chrome Yellow 2G	90,900	$45,213	99,300
40	58	Chrome Yellow R	74,000	42,700	75,700
53	61	Victoria Violet	30,900	28,283	14,200
57	66	Amido Naphthol Red 6B	112,200	61,012	148,000
73	76	Sudan II	20,600	19,684	8,800
79	82	Ponceau 2R	446,500	216,468	492,100
88	112	Bordeaux B	119,100	66,341	113,200
138	134	Metanil Yellow	512,400	326,105	466,900
146	141	Azo Yellow	117,400	91,831	115,300
151	145	Orange II	1,226,400	328,782	1,194,500
161	151	Orange R	102,500	37,741	.....
163	152	Lake Red 4B	30,800	59,770	28,700
176	161	Fast Red A	125,900	78,700	121,000
179	163	Azo Rubine	210,300	148,554	260,600
180	164	Fast Red VR	201,600	132,691	220,200
189	173	Lake Red R	346,300	293,529	359,200
202	181	Chrome Blue Black U	975,300	363,007	896,300
204	184	Chrome Black A	186,700	78,708	177,800
208	188	Fast Acid Blue R	215,800	136,292	261,300
216	202	Chrome Red B	68,000	48,000	95,000
234	211	Resorcin Brown B	169,700	104,129	215,000
246	217	Acid Black 10B	1,185,500	546,497	1,234,300
252	227	Brilliant Croceine	181,900	153,280	189,500
258	232	Sudan IV	37,500	39,322	46,700
262	236	Cloth Red 2B	28,000	28,000	43,000
289	257	Fast Cyanine 5R	423,830	313,000	492,000
299	275	Chrome Black F	124,300	90,340	116,600
326	279	Direct Fast Scarlet	262,400	381,706	272,800
331	283	Bismarck Brown	145,700	64,039	159,400
332	284	Bismarck Brown 2R	404,100	170,500	382,400
364	303	Paper Yellow	90,500	104,645	104,700
365	304	Chrysophenine G	560,900	310,418	623,900
382	319	Direct Scarlet B	103,409	129,000	98,000
387	322	Direct Violet B	30,100	30,580	33,400
394	327	Direct Violet N	49,700	60,049	57,800
401	333	Developed Black BHN	874,500	441,185	933,100
406	337	Direct Blue 2B	858,200	262,758	1,074,600
415	340	Direct Orange R	48,300	29,745	39,900
419	343	Direct Fast Red F	192,000	156,507	184,300
420	344	Direct Brown M	123,600	85,977	138,900
448	363	Benzo Purpurine 4B	426,400	246,388	460,400
495	405	Benzo Purpurine 10B	28,700	36,568	50,600
512	419	Direct Blue RW	101,300	88,497	114,600
518	424	Direct Pure Blue 6B	425,700	328,426	585,500
520	426	Direct Pure Blue	149,800	88,311	233,200
539	436	Direct Fast Black FF	153,800	93,479	.....
581	462	Direct Black EW	5,465,300	1,680,906	6,191,900
593	474	Direct Green B	425,500	216,007	502,300
594	475	Direct Green G	86,700	57,517	88,200
596	476	Direct Brown 3GO	680,800	256,061	734,700
620	9	Direct Yellow R	412,700	203,346	405,900
636	19	Fast Light Yellow 2G	92,800	182,307	86,800
640	23	Tartrazine	541,800	312,167	493,200
666	502	Acid Green B	73,300	82,997	74,900
680	515	Methyl Violet	667,200	620,125	753,200
698	530	Acid Violet	136,300	185,932	123,900
793	606	Phosphine	135,200	205,494	142,700
812	616	Primuline	187,000	100,542	232,600
814	617	Direct Fast Yellow	168,900	176,804	202,000
864	698	Nigrosine (spirit sol.)	378,942	176,139	336,857
865	700	Nigrosine (water sol.)	1,106,600	430,762	1,176,900
883	626	Gallocyanine	81,300	150,657	78,100
909	649	Cotton Blue	23,900	35,597	.....
		Sulphur Black	16,358,000	2,476,217	16,704,000
		Sulphur Blue	871,400	472,407	899,600
		Sulphur Brown	1,528,900	540,677	1,389,400
		Sulphur Olive	132,400	39,497	140,200

Col. Index No.	Schultz No.	Name of Dye	Sales—Pounds	Sales—Value	P'duct'n Pounds
		Sulphur Tan	157,800	$47,055	106,200
		Sulphur Yellow	464,000	186,690	395,800
1177	874	Indigo, 20% Paste.....	28,438,400	3,652,786	25,701,500
1180	877	Indigo Extract	78,800	44,841	80,100
		Benzo Fast Black.....	131,000	145,517	167,700
		Zambesi Blacks	292,200	204,661	315,800

RECENT PATENTS

Fabric-Dyeing Machine

August 31, 1926; 1,598,418

Ulrich Baumann, Jr., of Woodcliffs, New Jersey.

This invention relates to improvements in dyeing machines, and has particular reference to a machine for dyeing textile fabrics.

An object of the invention is to provide an improved machine wherein a plurality of tubs containing various liquids utilized in the dyeing process are assembled and into which pieces of fabric are successively conveyed so as to subject said fabric to the action of the baths or solutions in said tubs.

Another object is to control the feeding of a fabric to the various baths in such manner that the fabric, after immersion in one of the baths for a period of time, is, at the termination of such period, automatically transferred to and immersed in a succeeding bath.

A further object is to provide an apparatus which will lift a fabric supporting drum from one tub and deposit the same upon a platform for movement to a succeeding apparatus which is thereupon operable to lower the drum into another tub.

The above and other objects will appear more clearly from the following detailed description, when taken in connection with the accompanying drawing, which illustrates a preferred embodiment of the inventive idea.

Fig. 1 is a fragmentary side elevation of the machine constructed in accordance with the invention:

In the dyeing of textile fabrics it is customary to subject the fabric to a plurality of baths consisting of various solutions utilized to accomplish the different steps in the dyeing process. It is also customary to submit the fabric, depending upon its nature, to the various solutions or baths for predetermined intervals of time. Thus, as a specific example, which, of course, need not be strictly adhered to in carrying out the present invention, a fabric may be submitted to the following baths in succession for the stated periods of time, namely, acid, five minutes; water, five minutes; bleaching, fifteen minutes; water, five minutes; soap solution, fifteen minutes; water, five minutes; bleaching, fifteen minutes; water, five minutes; acid, five minutes; water, five minutes; dyeing, five minutes.

In cases where the fabric is submitted to the action of solutions for periods of more than five minutes, such as the bleaching and soap solutions, a number of tubs containing the same solution are placed in succession. Thus, where the bleaching is carried on for fifteen minutes three tubs containing the bleaching solution are arranged one following the other, it being understood that the fabric is transferred from one tub to the other at the termination of a predetermined period of time which, in the present example, is five minutes.

Construction

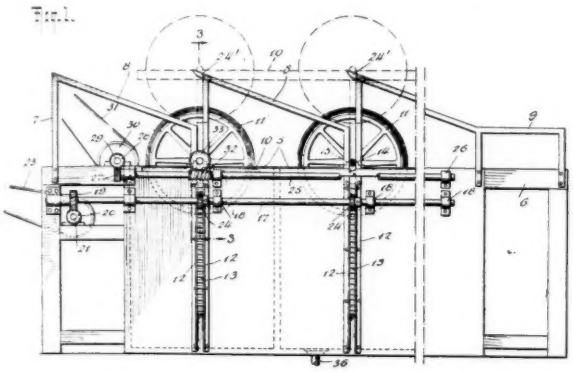
In carrying out the invention a plurality of tubs 5 are provided equal in number to the total number of five minute intervals occupied during the dyeing process. These tubs are supported in a row by a suitable framework 6 and are arranged in juxtaposition to each other so as to occupy a minimum space. Secured to opposite sides of the tubs and framework and extending thereabove are a plurality of frames 7 arranged in pairs and each frame having a cross piece 8 arranged in an inclined position and combining with the cross piece of the associated frame to form an inclined platform for a purpose which will presently appear.

The pair of frames at the extreme left of Fig. 1, which is the inlet end of the machine, are attached partly to the framework 6 of the machine, and partly to the first tub 5, the right-hand extremities of said frames being secured to said tub at approximately the middle thereof. The next pair of frames in the order of succession are secured to the first-named tub, and also to the succeeding tub with the longer vertical members of said frames arranged adjacent the shorter members of the preceding frames and forming a space therebetween for a purpose to later appear.

The succeeding frames 7 are arranged in a like manner and by this arrangement it will be apparent that the platform formed by each pair of frames will overhang two adjacent tubs with the space between adjacent pairs of frames disposed substantially at the middle of each tub. The pair of frames associated with the last tub at the delivery end of the machine is provided with an extension 9 secured to the framework 6 and forming a horizontal platform upon which the various fabric-carrying drums 11 are finally deposited after passing through the solutions in the different tubs. Secured to each tub 5 on opposite sides thereof and in direct alignment with the adjacent vertical members of the pairs of frames secured to said tub is a set of guide strips 12, preferably formed of angle iron and arranged a distance apart substantially equal to the space between said adjacent vertical members of the frames. Slidably mounted for vertical movement between each set of guide strips 12 and into said space is a rack bar 13, operable to lower a drum 11 into a tub and lift the same therefrom at the termination of a definite period of time.

The upper ends of the various rack bars are connected by a drum supporting member or bar 10. At the beginning of the operation of the machine the supporting mem-

ber 10 and the various rack bars 13 are elevated sufficiently to permit a drum 11 to be rolled downwardly on the first platform until the trunnions 14 of drum 11 are resting upon the supporting bar 10. Then, as the bars 10 and 13 are lowered the drum moves along the bar 10, by reason of the inclination of the platform, until the



trunnions engage in the space between the shorter end of the first platform and longer end of the next succeeding platform.

Continued downward movement of the bars 10 and 13 will then lower the drum 11 into the tub until said trunnions engage the bearings 15 secured to the top of the tub. In this position a portion of the drum containing the fabric which is wound thereon in any suitable manned will be immersed in the solution in the tub 5. Each trunnion 14 may be provided with inner and outer collars 16 which will be effective to prevent shifting of the drum in a direction along its axis while in operation.

While the drums are immersed in the tubs and the trunnions thereof are resting upon their bearings 15, the invention provides means for continuously rotating said drums in order that the fabric on the drums will become thoroughly saturated in the solutions in the various tubs. To this end there is provided a shaft 25 on each side of the tubs mounted in suitable bearings 26 and arranged in parallelism with the shaft 17. The forward end of each shaft has a worm gear 27 meshing with a similar gear 28 carried by the adjacent end of a transversely disposed shaft 29 supported by the framework 6. One end of the shaft 29 carries a pulley 30 supporting a drive belt 31, which is connected to a suitable source of power, such as a motor (not shown).

Operation of the Machine

On each shaft 25 there is a plurality of worm gears 32 each of which is designed to mesh with a similar gear 33 carried by one of the trunnions 14 of each drum when the trunnions of said drum are resting in their bearings 15. The shaft 25 is continuously driven so that during the intervals of time that the gears 32 and 33 are meshing the drums will be revolved. When the rack bars 13 are operated to lift the drums from the tubs the initial upward movement of said drums will disengage the gears 33 from the gears 32 and thus cause a cessation of the rotation of said drums.

Briefly, the operation of the machine is as follows:

With the supporting members 10 and rack bars 13 partially elevated a drum containing a fabric is placed upon the platform of the frames 7 at the inlet end of the machine and said drum is allowed to roll along said platform until its trunnions come in contact with the supporting member. Then as the rack bars 13 are lowered the drum consequently moves downwardly along the platform and finally into the first tub 5. When the gear 33 of the drum engages the gear 32 carried by the shaft 25 rotation of the drum will commence and continue until a predetermined period of time has elapsed at which time the shaft 17, the rotation of which is stopped by the stopping of the motor driving the same when the rack bars have reached the extremities of their downward movement, will again be rotated but in an opposite direction so as to start the upward movement of the rack bars. This upward movement disconnects the drum from the shaft 25 stopping the rotation of the former and the movement continues until the supporting member 10 reaches the extremities of its upward movement, at which time the drum trunnions will engage over the arms 24′ and be deposited upon the platform of the second set of frames 7. The operator observing the movement of the rack bars will deposit a second drum upon the first platform about the time that the forward extremity of the bar 10 intersects the plane of the platform so that said second drum will roll down the platform and onto the bar 10. This operation is repeated at the termination of each definite period of time and upon each operation of the rack bars each of the drums is lowered into a tub, elevated therefrom and advanced to the next succeeding tub until each drum has passed through all of the various solutions and been deposited upon the platform 9 at the delivery end of the machine.

PROSPECTIVE MARKET FOR DYESTUFFS IN SEVILLE, SPAIN

It is estimated that Seville cleaners and dyers consume around one and one-half million pesetas—approximately $250,000—worth of dyes and colors annually. These are supplied by German manufacturers, says a dispatch from Vice-Consul Cropper of Seville.

German and Swiss dye manufacturers, according to the principal dyers in this city, have formed a powerful combine, and the Spanish organization, known as the Fabrica Nacional de Colorantes y Explosives, has adhered to and acts as Spanish General Agent for this trust.

Prices on black dyes have been raised 25 per cent, and Spanish dyers are complaining bitterly of the exorbitant prices charged by the trust for its products.

It is believed that the present would be a favorable opportunity for the introduction of American dyes into the Seville—if not the entire Spanish—market.

Technical Notes from Foreign Sources

Finishing Cotton Linings

Jaconet is a type of lining that has to be finished on both sides, and hence both the right and the left side of the fabric must be singed. All the colored jaconets, and this includes the black as well, are semi-bleached before dyeing. This semi-bleaching process consists of a single boiling, scouring and final weak alkaline treatment, and it is necessary in order to obtain uniform dyeings. It is recommended that the semi-bleached goods be introduced into the dye liquor while they are still in the wet condition, for this saves a drying and subsequent wetting down operation.

The dyeing itself is carried out with substantive dyestuffs for the most part, and when particularly bright shades are desired, the basic dyestuffs are employed and used along with the sulphur dyes for dyeing black shades. The diazotizable dyestuffs are used in the rarest cases. In spite of the fact that it is possible to use quite a large number of dyestuffs for this purpose, the dyeing of cotton linings is an operation which requires the most painstaking care and attention on the part of the dyer. It is absolutely necessary to obtain a product that is accurately dyed to match the sample, for even the slightest variation in the shade of the lining cloth, in spite of the fact that the best finishing compositions are employed, will instantly be detected by the user of the lining.

In finishing brightly colored jaconets, a sizing compound of the following composition is generally employed. The size contains 10 kilograms of potato starch, 1 kilogram of white grain soap, ½ a kilogram of cocoa butter and 1½ kilograms of 50 per cent Turkey Red oil, the entire composition being made up to the volume of 100 liters.

The quantity of size used will depend on the quality of the raw fabric. After sizing the fabric is dried, cooled, moderately stretched and then rolled up and allowed to remain overnight in order to allow the moisture to penetrate uniformly through all parts. Passage of the fabric through the calender gives it the desired finish.

In the case of black jaconets it is necessary to subject the fabric to a thorough starching treatment in order to obtain the full effect of the black. The fabric is thus best treated in a machine which stretches the cloth and starches it at one and the same time. A standard composition of the sizing mixture is as follows: Nine kilograms of potato starch are dextrinized with 1 per cent of diastofor for a period of ten minutes, and then mixed with 500 grams of cocoa butter, the same amount of grain soap, 2 kilograms of 50 per cent Turkey Red oil, 300 grams of oxidized hematine and 80 grams of potassium bichromate. The entire mass is made up to a volume of 100 liters, and when the fabric has been dyed with Sulphur Black, an addition of 500 grams of sodium acetate is also made.

The sizing is applied in the same manner as described and the aftertreatment is also similar. (For further details see Melliand's Textilberichte, 1927, pp. 53-54.)

Aminated Cotton

Cotton and other cellulose materials, when treated with ammonia, yield a fiber which contains from 1 to 3 per cent of nitrogen, the reaction either being the substitution of an amino group for a hydroxyl group, or partial oxidation of the cellulose, and such aminated yarns are dyed directly with acid dyestuffs. A so-called "immune" yarn is prepared by the partial esterification of cotton with the aid of para-toluenesulphochloride; it has considerable immunity to substantive dyestuffs, and can be treated with ammonia to form aminated yarn.

Instead of ammonia, organic basic nitrogen compounds can be used for the treatment of cotton or "immune" yarns; for example aliphatic amines, such as ethylamine or dimethylamine in aqueous solution give a yarn which can be dyed with tartrazine, cyanol, etc. Benzylamine gives a yarn which possesses a strong affinity for acid dyestuffs. Molten urea, phenylhydrazine, piperidine, and also tertiary amines can also be employed for this purpose. The essential quality of aminated yarns is their smooth dyeing property with the acid dyestuffs, which is not shared by "immune" or ordinary cotton. (Zeitschrift fuer angewandte Chemie, 1926, Vol. 39, pp. 1509 and 1514.)

Conditions of Xanthation in Viscose Rayon Manufacture

The quantity of carbon disulphide required to produce complete xanthation is from 40 to 75 per cent. The highest yield of xanthate and the most stable conditions correspond to approximately 50 per cent. When the temperature of ripening is comparatively high, it has little influence on the quantity of combined alkali, but the combined sulphur decreases rapidly. Hence it is contended that the combined alkali and combined sulphur do not necessarily vary proportionally.

The most favorable temperature of xanthation is 15 deg. Cent. During ripening the changes in the colloidal properties of the viscose gel particles and in the structure of the viscose sol take place at different velocities. The optimum duration of ripening is between one and four days, corresponding with the optimum properties of the filament or film. When this duration is surpassed the combined alkali and sulphur decrease, and the viscose tends to become unstable. The optimum degree of ripening may be recognized by the appearance of the precipi-

tate formed on decomposing viscose of a certain concentration with 20 per cent sulphuric acid. At the optimum point the regenerated cellulose is in the form of long fibrous particles, and should not be short or powdery. The dispersity of the viscose gel increases with the advance of ripening up to a maximum on the third day, and then decreases. (Cellulose Industry, Tokio, 1926, Vol. 2, pp. 321-335.)

Fast Dyeings on Textile Fiber

Textile fibers are dyed by impregnation with a compound which is capable of coupling with a diazo compound and a nitrite, and afterwards treated with an acid solution of a diazotizable amine. Alternately, particularly for purposes of printing, the diazotizable amine may be applied to the fiber before treatment with the acid solution. A reddish orange shade on cotton yarn is obtained by impregnating 10 grams of yarn with 200 c.c. of a solution which contains per liter 10.5 grams of the anilide of beta-hydroxynaphthoic acid, 17.5 c.c. of a solution of caustic soda (density 1.31), 22 c.c. of Turkey Red oil, 8 c.c. of a 30 per cent formaldehyde solution, and 30 grams of sodium nitrite. Then the yarn is treated with 200 c.c. of a solution which contains per liter 0.95 gram of the hydrochloride of 2:5-dichloroaniline and 7.5 grams of aluminum sulphate. (British Patent No. 262,357.)

Naphthol Dyes on Rayon

Although certain rayons cause difficulties in the dyeing process, which are occasioned by the peculiarities of the fiber, it can, nevertheless, be said that in general the dyer is well conversant with the dyeing of rayon. There are difficulties, however, and attention must be paid to the character of the rayon fiber as well as to that of the dyestuffs employed for this purpose, and these peculiarities are overcome and the dyeing is rendered simple in certain special processes. It is generally true that those colors and dyeing methods which are well suited for the dyeing of cotton and the other vegetable fibers, are also suited for dyeing the rayons with the exception of acetate rayon. Frequently the fastest dyestuffs are required for the dyeing of the rayons. Vats and others of the faster colors are used, but there are none that fulfill the purpose so well as the naphthol colors.

The naphthols give dyed fibers which are very resistant to the effects of chlorine, light, washing, ironing and other influences. The precursor of these dyestuffs, Para Red, has properties well known to all dyers. The naphthol dyestuffs are also marked for the great brilliancy of shade they give on the rayon fibers, marked advantage in addition to the fastness. The color tones, mostly obtained with the naphthol dyestuffs at the present time, are red, scarlet, yellow, orange, pink, Bordeaux, maroon, blue, brown and black.

The Para Red process is well known to the dyer and does not offer any special problems, except those that arise from the fact that the process is being applied to a special kind of dyeing. Certain definite precautions have to be exercised and this may be the reason why there has been a tendency to avoid using this process in certain instances. However, it is true that the dyer readily becomes experienced in the application of this process, and then it is a simple matter to carry out in the dyeing establishment.

There are two main operations in the dyeing of rayons by this process. In the first operation the rayon is given a ground treatment in a solution of a naphthol, and in the second operation the dyestuff is developed in a solution of a diazotizable base. The rayon, without first being washed, is introduced into a naphthol solution of sufficient concentration and the rayon yarn is then treated in this liquor for a period of twenty-five to thirty minutes at a temperature of approximately 25 deg. Cent. The yarn is then centrifuged and, of course, not washed. It is well to place the yarn between cloths which have been previously impregnated with the naphthol solution.

The next operation is the development of the color which takes place in the cold diazo solution and lasts for twenty minutes. In order to remove the excess diazo solution, the yarn is first washed with the aid of cold water and then with hot water of approximately 60 to 80 deg. Cent. Then it is treated with a solution which contains four to five grams of soap per liter, the temperature being 80 deg. Cent. (Der Textilchemiker und Colorist, 1927, 18.)

Titanium Salts in Dyeing

Titanium chloride and titanium sulphate are used in dyeing. They are strong reducing agents and are purchased in the form of concentrated solutions. Their action is stronger than that of stannous chloride, and hence they can be used not only in the place of the latter salt, but also for such purposes as stannous chloride is not suited. These titanium salts are very well suited for stripping dyestuffs from cotton, particularly when it has been dyed with substantive colors. It is also possible to use them for the same purpose on silk and wool. Azo dyestuffs on cotton are immediately destroyed, especially when the chloride is employed. A hot dilute solution of titanium chloride has been found well suited for stripping the color from goods which have not been correctly dyed. The action is completed in within less than a minute and the goods, after being washed, can be directly redyed. The quantity of titanium chloride required for this purpose varies in accordance with the depth of the color and the character of the dyestuff. In general the proportion varies between 1 and 10 per cent of the weight of the goods treated. When the water is hard, it is necessary to add hydrochloric acid to the titanium salt solution in order to prevent the precipitation of the insoluble, white titanic acid.

Basic dyestuffs which have been dyed with the aid of tannin tartar emetic mordant are generally completely

destroyed by treatment with titanium chloride, whereby the fiber becomes brownish in color due to the formation of a titanium tannate. Titanium chloride acts as a discharge on ingrain color dyed cotton. Primulin Red becomes yellow, Paranitraniline Red is decolorized. Naphthylamine Scarlet is affected in the same manner, but only after a certain length of time has elapsed. Aniline Black and the various sulphur colors become brown or gray. However, when washed and exposed to the air they return to their original shades.

Indigo is first reduced to the state of Indigo White, which can then be removed by treatment with a dilute caustic solution. The color is completely destroyed by prolonged boiling.

Use as Mordant

Titanium dioxide has been used as a mordant in certain special cases, and has been found to possess marked advantage over alumina. Thus Alizarin Yellow yields a titanium mordant which is at least as brilliant as that obtained with the alumina mordant, except in that it is much faster. Alizarin Scarlet, dyed on a titanium-mordanted wool, is the fastest color that can be dyed on wool. It is essential that the titanium dioxide used for this purpose is entirely free from iron. The salts of titanium used in dyeing include the sulphate, the fluoride, the chloride, the lactate and the tartrate, as well as double salts with alkalies.

Titanium sodium sulphate has been found to be a very energetic reducing agent, and can be used for the majority of the purposes for which titanium salts are well suited.

Titanium tanno-oxalate is a new compound well suited as a cotton mordant. The fastness of colors dyed with the aid of such titanium salts is so great that they have been used for dyeing military fabrics. Mordanting with tannin and titanium oxalate is very well adapted for basic dyestuffs on cotton. The solution is made by dissolving titanium oxytannate in oxalic acid. The goods are impregnated with this solution, and the mordant precipitated on the fibers by treatment with a hot salt solution at a temperature of 70 deg. Cent. It is also possible to use the titanium oxytannate in a hydrochloric acid solution or in the form of a double salt with potassium tannate.

The simple titanium salts can be used on wool, as this can be fixed without any further trouble. The solution of titanium oxytannate is well suited for the aftertreatment of dyed cottons in order to increase the fastness of the color. It serves not only for basic dyestuffs but also for the so-called Janus dyestuffs, for Methylene Blue, Rhodamine and Aniline Black. Titanium oxyoxalate, titanium tartrate, titanium tanno-oxalate, titanium alkali-oxalate and titanium alkali sulphate, as well as the chloride, can be used to advantage in the dyeing of silk. Titanium salt can also be advantageously used in the aftertreatment of chrome colors. When the color bleeds into the white of the fabric, it is possible to overcome this difficulty by a short treatment in hot, very dilute solution of a titanium salt. Titanium salts can also be used as discharge agents in printing. (Der Textilchemiker und Colorist, 1927, 7-8.)

GERMANY EXPORTS HIGHER PRICED COLORS

It is becoming increasingly difficult to appraise the value of Germany's foreign trade in dyestuffs, owing to the growth of her interests in extraterritorial plants from which considerable sums in the form of invisible exports are derived The tabulation of Germany's exports of dyes therefore does not reveal the strength of the I. G. in the international field of dyes and colors. A large part of Germany's pre-war exports has been lost through the growth of dyestuffs industries in some of her most lucrative markets and the erection of tariff and licensing barriers to protect them. However, it is probable that no inconsiderable amount of revenue will be derived from the United States, Spain, Japan, Russia and other countries by virtue of participations in their dye industries, according to a report from Consul H. C. Claiborne, Frankfort.

The changed conditions in the former dyestuffs markets of the world have led the I. G. to concentrate its efforts towards the production for export of a wide range of delicate and high-priced dyes which it believes that the more recently organized industries in competitor countries cannot produce on a competitive basis.

UNFAVORABLE SITUATION OF CHEMICAL INDUSTRY IN CZECHO-SLOVAKIA

Employment in the Czecho-Slovak chemical factories is at present considerably below normal, as a result of the diminished use of chemical products, especially by the various branches of the textile industry. The domestic chemical industry is chiefly affected by German competition, which it is unable to meet successfully and at the same time invest capital in the development and perfection of the industry in this country. The Czecho-Slovak chemical industry, like other domestic industries, is heavily burdened by taxes and social fees. Czecho-Slovak producers state that the present situation would be greatly ameliorated if they were able to dispose of their production, especially pharmaceutical goods, in Russia; but, in view of the financial difficulties involved and the long credit terms demanded by Russia, there is not much hope of developing foreign sales there. (Consul C. S. Winans, Prague.)

Fred W. Nash has taken the position as overseer of dyeing for the north Berwick (Maine) Company. Mr. Nash was formerly employed for Faulkner & Colony, Keene, N. H.

CHEMICAL SAFETY CONFERENCE

The tireless work of spreading safety education continues. Among the active agencies that are striving to keep down accident rates in industry few are doing better work than the Chemical Section of the National Safety Council. The section's mid-year meeting will be held on April 27 in the Assembly Room of the Newark Chamber of Commerce, Newark, N. J.

Speakers of prominence are scheduled for both morning and afternoon sessions and a large attendance, not only from the East, but also from other parts of the country is anticipated.

The following talks are scheduled for the morning session: "Attitude of the State on Accident Prevention," John Roach, Deputy Commissioner of Labor, Department of Labor, State of New Jersey, Trenton, N. J.; 2. "Safety Speeds Production," J. E. Hannum, Director, Safety and Production Study, American Engineering Council, Washington, D. C.; 3. "The Benzol Problem in Industry," Dr. Leonard Greenburg, U. S. Public Health Service, School of Medicine, Yale University, New Haven, Conn.; 4. "How the Workman Can Protect Himself," Dr. G. H. Gehrmann, Medicinal Director, E. I. du Pont de Nemours Company, Wilmington, Del. Following these speeches, the employees of the Public Service Company of New Jersey will stage a demonstration of the Prone Pressure Method of Resuscitation.

A safety forum will be held in the afternoon discussion to be stimulated through the following talks: 1. "Instructing New Men in Safety," J. Dohan, Mutual Chemical Company, Jersey City, N. J.; 2. "Respirators and Gas Masks," C. R. Schroeder Metal & Thermit Company, Jersey City, N. J.; 3.. "The Importance of Maintenance in Safety," Stanley Warzala, Calco Chemical Company, Bound Brook, N. J. At 4.00 P. M. the meeting will adjourn and unite with the delegates to the Eastern Safety Conference in listening to Dr. R. R. Sayres, U. S. Bureau of Mines, talk on "Ventilation of the Vehicular Tunnel."

DU PONT EXHIBITS PRODUCTS AT ATLANTIC CITY

During the last two years, according to reports just made public, 449,258 visitors called at the Du Pont Products Exhibit on the Boardwalk at Atlantic City to view the various articles on show there made from Du Pont raw materials. These included nearly 200 different lines, and consisted of hundreds of articles made in whole or part of Fabrikoid, Pyralin, chemical products, rubber products, rayon, dyestuffs, Cellophane, Duco, paints and varnishes.

Special exhibits were made during the past year of the newer products recently put into manufacture by the company. The Du Pont Company has followed the policy of maintaining large chemical research organizations, this being regarded as essential to the maintenance of the company's position in its field and its growth with the development of the art. Processes and products may become obsolete overnight. It has been felt that failure to progress in chemical science by improvement in existing processes and products and the development of new products can result, in the course of time, only in retrogression.

As a result of this policy there have been developed recently such products as "oval powder," an improved sporting powder; Duco, a new finish for automobiles, furniture, and other lines, "Brush Duco," a fast drying enamel for general household application; new types of Fabrikoid; nitroglycerin dynamite, which will not freeze; better types of chemicals used in vulcanizing rubber; chemical disinfectants for cereals and root crops which substantially increase their yield and quality, and many other processes and products.

All these products have been shown recently at one time or another at the Atlantic City headquarters. This exhibit has been maintained by the company for some years and it is believed to be the only show of its kind in the United States by a diversified chemical manufacing industry in which the relation of chemical products to other manufacturing lines is shown by actual exhibits. The primary purpose of the display is to exhibit and not to sell goods, so that visitors to the establishment are not asked to buy the articles.

COLOR TECHNOLOGISTS SOUGHT FOR CIVIL SERVICE

An open competitive examination for color technologist has been announced by the United States Civil Service Commission. Applicants must be trained in the science of color measurement to be able to fill the position of principal scientific aid.

Applications must be on file with the Civil Service Commission at Washington, D. C., not later than May 14. The date for assembling of competitors will be stated on their admission cards, and will be about ten days after the close of receipt of applications.

The examination is to fill vacancies in the Bureau of Agricultural Economics, for duty in Washington, D. C., or in the field, and vacancies occurring in positions requiring similar qualifications.

The duties are to perform preliminary investigational work relative to the practical application of mechanical and other means of accurately measuring and determining color where this is a factor in the standardization and inspection of hay, cotton, meat and other agricultural products; and to conduct analytical and research laboratory studies incident thereto, including the study and practical application of methods and equipment to this phase of investigational work, with a view to applying most efficiently such methods and equipment to color factors.

Competitors will be rated on practical questions relative to the duties of the position, and their education and experience.

YELLOW BROWN ADDED TO SULFOGENE SERIES

The Dyestuffs Department of E. I. du Pont de Nemours & Co. announce the production of a new color, Sulfogene Yellow Brown M, a clear golden brown for which excellent fastness is claimed. This product is used mainly as a selfshade, but is suitable for combination work when the shade is desirable, as it is said to dye very evenly.

It can be used on cotton in all stages of manufacture, and is suitable for use on either circulating machines or on the padder or jig, as it is described as having excellent solubility and good exhausting properties.

Sulfogene Yellow Brown M is further described in the announcement as possessing very good fastness to washing, and good resistance to water, ironing, alkali, acids, mercerizing, stoving, perspiration, as well as being one of the colors fast to cross-dyeing. Fastness to light and washing is considerably increased by aftertreatment with copper, chrome and acetic acid, but the shade becomes somewhat duller and redder.

TALKS ON ASBESTOS

A. Allwood, a student in the North Carolina State College Textile School, recently gave an interesting and instructive talk to the Tompkins Textile Society on the subject of asbestos. Mr. Allwood was for eight years connected with the British Belting, Ltd., England. During four of these eight years he did research work for this concern.

Mr. Allwood stated that asbestos, which is a mineral of fibrous structure, is of value because it is both acid and fireproof. He explained that the theoretical composition of this substance is: Silica, 55.6; ferrous oxide, 16.6, and magnesia, 27.8. However, as Mr. Allwood further explained, in the various classes of asbestos, the proportion of ferrous oxide is different. The fiber has a silky appearance, is square in cross section, practically uniform in size throughout, and is from one-fourth inch to eighteen inches in length.

The speaker explained how crude asbestos is obtained from mines or quarries, and then treated so the pure fiber may be separated from dirt and other foreign matter. He discussed in detail the carding, spinning and weaving of asbestos. These processes are much the same as those used in the manufacture of cotton fabrics.

STANDARDS FOR 446 COMMODITIES COMPILED

A publication containing the 446 master specifications of commodities the use of which is mandatory upon all departments and establishments of the United States Government has been issued by the Bureau of Standards. The specifications are arranged in the publication in alphabetical and numerical order.

The specifications included in the published lists are those which had been adopted by the Federal Specification Board up to November 15, 1926, and represent the work of seventy-four technical committees extending over a period of four and one-half years. These committees are composed of experts in the respective lines of work in the Government service.

In addition to presenting the lists of master specifications, the new publication contains instructions for obtaining specifications, many of which are in printed form and must be purchased from the Superintendent of Documents. Copies of this publication also are obtainable at the Superintendent of Documents, Government Printing Office, Washington, D. C., for the price of 10 cents each.

Sure Shots for Salesmen

III—THE DEPARTURE

By Stanley Schultz

WE have now brought our ship of higher education almost to port. We have found and approached the customer, taken his order away from him, and the only thing left is—*the departure*.

Like everything else in the gentle art of gab, there is a proper time for this act. To stay too long after having the order can spoil everything. The same gentle taste should be used as when calling on your best girl. You can either go as soon as she has promised to spend your pay check for the rest of your life, or you can wait till her old man throws you out.

I once knew a man who went to call on a girl—well, not exactly a girl; she was a widow who had been a war bride (Civil). He had met her at a church supper, a poor place for a loose man to meet a woman looking for something on which to tie. Everything she put before him was made by her own hands. This was not unlikely, as hers were like palm-leaf fans. By the time that supper was over she had created enough interest for him to want to see more, and so he called and overstayed his leave. Instead of looking for his hat when they had exhausted the weather, he stuck around to take a hack at the neighbors, and when that was all over he found himself the father of a ready-made family of five. He hasn't been to a church supper since.

Many salesmen have the bad habit of staying too long, and instead of leaving the man when he is still unconscious they let him recover, with the result that he changes his mind and takes the order away from them and they have their work to do all over again. The right thing to do is: as soon as you have that order, grab his hand and run! Drop his hand about halfway to the door. Don't stick around. Get out and spend the rest of the day waiting for the next train out of town.

There you are. You see, there is really nothing to this selling game. It is just like giving gum drops to an Eskimo. All you need is a good voice and a good pair of feet.

It is the earnest hope of the writer that these hints will

help some man toward that path which leads to a train. There are several additions I feel should be made to what has gone before. These I call "The Post-Graduate Course." It contains matters which every well-informed salesman should know. I feel that I am well versed on all of them through years of practice. It contains such necessary subjects as, "How Not to Make Out Reports," "How to Conduct Oneself with the Firm," "What to Do While Waiting for the Train," "How to Take Off Your Pants in an Upper Berth." I even have my own methods of dyeing, bleaching and getting finished. If you want to hear about these write in and say so.

As we would say in Spain, "Avoirdupois."

Sueddeutsche Sprengstoffwerke A. G., subsidiary of the Nobel concern, acquired in February, all works of the Bayerische Sprengstoffwerke A. G., of Nuernberg. Thus the Nobel concern gets control of the Bavarian explosives industry. It is planned to extend the Thansau chemical works and to purchase more properties. Sueddeutsche Sprengstoffwerke, originally the Monachitwerke A. G., already own the black powder plant in Stefanskirchen and in Farsberg (Upper Palatinate), and the explosive works in Neumarkt. The report comes from Trade Commissioner W. T. Laugherty, Berlin.

Charles E. Mullin was recently elected to a Fellowship in the Textile Institute, Manchester, England.

Edward S. Tillinghast, who has been assistant chemist at the bleachery of the Pacific Mills, Lyman, S. C., has been appointed overseer of dyeing at that plant.

Clifford B. Hayes, for the last year production manager of the Pacific Mills sales organization in New York, has been chosen to succeed Leonard S. Little, resigned as general superintendent of the Lyman (S. C.) Department of the Pacific Mills.

L. C. Timmer has become assistant chemist at the bleachery of the Pacific Mills, Lyman, S. C.

Thomas Connelly, formerly overseer of perching for the Uxbridge (Mass.) Worsted Company, Inc., has been appointed overseer of finishing at the plant.

Fessenden S. Blanchard, assistant to the treasurer of the Pacific Mills, Lawrence, Mass., has been appointed production manager of the company.

R. J. Kennedy is now general superintendent of the plant of the Augusta Knitting Corporation, Whitesboro, N. Y.

James J. Sheridan has taken the position as superintendent of the finishing department at the plant of A. V. Morris & Sons, Amsterdam, N. Y.

C. W. Hanne, who has been connected for a good many years with A. W. Buhlmann Company, textile engineers and machine builders, is now affiliated with the Bay State Thread Works, Springfield, Mass. Mr. Hanne has been assigned as manager of the Bay State's New York office.

James A. Christenson, for several years connected with the engineering department of the Hamilton Woolen Company, Southbridge, Mass., has gone to Chicago where he has accepted a similar position His family will join him in June.

Charles Welles, formerly overseer of finishing for the Mystic (Conn.) Worsted Mills, Inc., is now night overseer of finishing for the Uxbridge (Mass.) Worsted Company, Inc.

Frank J. Newenhaus, formerly with the La Francaise Piece Dye Works, Paterson, N. J., has recently commenced his duties as general manager of the Hamilton Piece Dye Works, also of Paterson.

John H. Bence, overseer of dyeing for the Hinsdale (Mass.) Woolen Mills, has resigned his position with that company.

Julius Gyllensvard has accepted the position as overseer of dyeing for the Hinsdale (Mass.) Woolen Mills. Mr. Gyllensvard comes from Pittsfield, Mass.

William Stewart has taken the position as overseer of finishing for Maurice Levy Company, New Rochelle, N. Y. Mr. Stewart comes from Paterson, N. J.

Stephen Homic has taken the position as night overseer of finishing for the Uxbridge (Mass.) Worsted Company. Mr. Homic comes from Woonsocket, R. I.

Thomas E. Heaton has taken the position as overseer of dyeing for the Great Falls Woolen Company, Somersworth, N. H. Mr. Heaton was formerly employed by the Quinapoxet (Mass.) Manufacturing Company.

INDUSTRIAL LEADERS TO AID BOY SCOUTS

Leaders of the important industries and trades of Greater New York have pledged their support to the Boy Scout Foundation in the creation of the largest permanent boys' camp in the world, which is to be created for the Boy Scouts of the five boroughs. Each borough will have a separate cantonment in an immense tract of land, with a special lake for its individual use. To buy, develop and equip this property, erect the hundred buildings required and provide for the various Scout activities in Greater New York, a city-wide campaign for $1,000,000 is to be conducted from April 20 to April 30.

In this undertaking the Boy Scout Foundation, which is chartered by the National Council, Boy Scouts of America, has received promise of support from the big groupings of New York business. Committees are being formed and special teams organized to represent each particular trade.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1924, OF AMERICAN DYESTUFF REPORTER.

Published biweekly at New York, N. Y., for April 1, 1927.

State of New York, County of New York, s.s.:

Before me, a notary public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the publisher of the American Dyestuff Reporter, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 445, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher—Alfred P. Howes, 90 William Street, New York City. Editor—Louis A. Olney, Lowell, Mass. Managing Editor—Clayton Hoagland, 90 William Street, New Yo.k City. Business Manager—Alfred P. Howes, 90 William Street, New York City.

2. That the owner is: Howes Publishing Company, Inc., 90 William Street, New York City; Alfred P. Howes, 90 William Street, New York City; Mary K. Howes, Northampton, Mass.; J. T. Howes, Rutherford, N. J.; D. C. Howes, Rutherford, N. J.; Louis A. Olney, Lowell, Mass.; William F. Collins, Upper Montclair, N. J.; William H. Collins, Upper Montclair, N. J.; Joseph L. Schroeder, Hartsdale, N. Y.; N. H. Hiller, Carbondale, Pa.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

Sworn to and subscribed before me this 29th day of March, 1927.

Alfred P. Howes, Publisher.

[Seal] Caroline Essenbreis.

(My commission expires March 30, 1927.)

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

CHEMIST

Has specialized thoroughly in the analysis, manufacture and application of sizings, softeners and finishing materials and general adhesives. Technical graduate; experienced, capable worker. At present employed. Seeks connection offering opportunity for advancement. Classified Box 376, American Dyestuff Reporter.

FIRST CLASS DYER

Fourteen years' experience in processing wool and worsted, union piece goods of all kinds, raw stock, yarns, rayon and cotton goods. Both laboratory and selling experience. Textile school graduate. Seeks satisfactory connection with dyestuff manufacturing concern or chemical house as practical demonstrating salesman. Excellent references. Classified Box 380, American Dyestuff Reporter.

SALESMEN WANTED (2)

Well-established, reputable house manufacturing numerous dyestuffs, oils, softeners, sizing and finishing materials, desires to increase its sales force in Southern territory. Applicants must state experience and full qualifications. Excellent opportunity for the right men. Address Classified Box 381, American Dyestuff Reporter.

WOOL DYER

Excellent wool dyer, experienced on pieces, stock and yarn, desires position in New York State or vicinity New York City. Long experience; excellent references. Address Classified Box 382, American Dyestuff Reporter.

CHEMIST

Chemist with ten years' experience in the dyestuff industry, including research and plant supervision, desires position with a chemical concern in this or other field. Available immediately. Address Classified Box 383, American Dyestuff Reporter.

CHEMIST WANTED

Chemist experienced in quantity production of sulphonated oils. Should have experience in textile and tanners' specialties and greases. Address: Classified, Box 384 American Dyestuff Reporter.

SALESMEN

Salesmen—two, for Pennsylvania and Canadian territories. Textile school graduates with mill experience preferred. Give full particulars. Address: Classified, Box 385, American Dyestuff Reporter.